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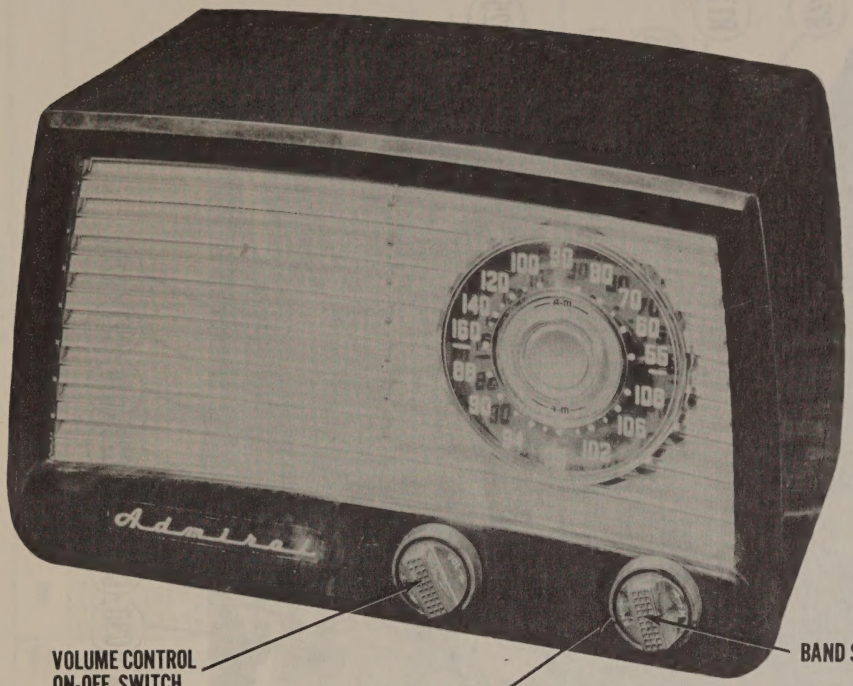
ADMIRAL
CHASSIS 6Q1



ADMIRAL
CHASSIS 6Q1

ADMIRAL MODEL 6Q12

TRADE NAME	Admiral, Models 6Q11, 6Q12, 6Q13, 6Q14 (Ch. 6Q1)
MANUFACTURER	Admiral Radio Corp., 3800 W. Cortland St., Chicago 47, Illinois
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES(SIX)	Types 12AT7 FM Conv.-AM Osc., 12BA6 FM 1st IF-AM Mixer, 12BA6 FM 2nd IF-AM 1st IF, 12AL5 Ratio Det., 12AV6 DET-AVC-AF, 50C5 Power Output
POWER SUPPLY	110-120 Volts AC — RATING: .26 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC — FREQ. MOD. 88-108MC

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R8
C16
C25
C3
R11
R6
C18
R12
C19
R10
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R14
R15
C21
R18
C22
C31
R24
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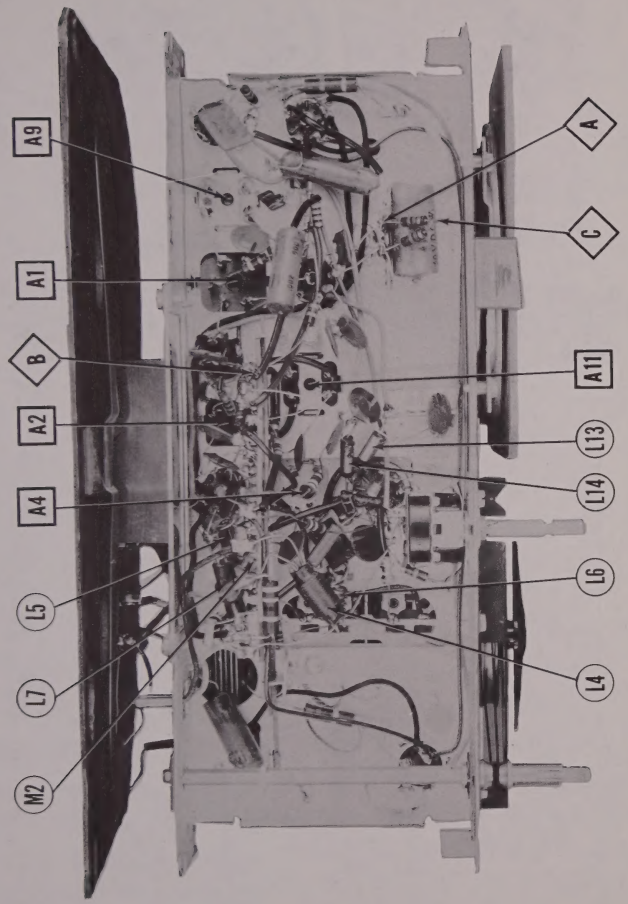
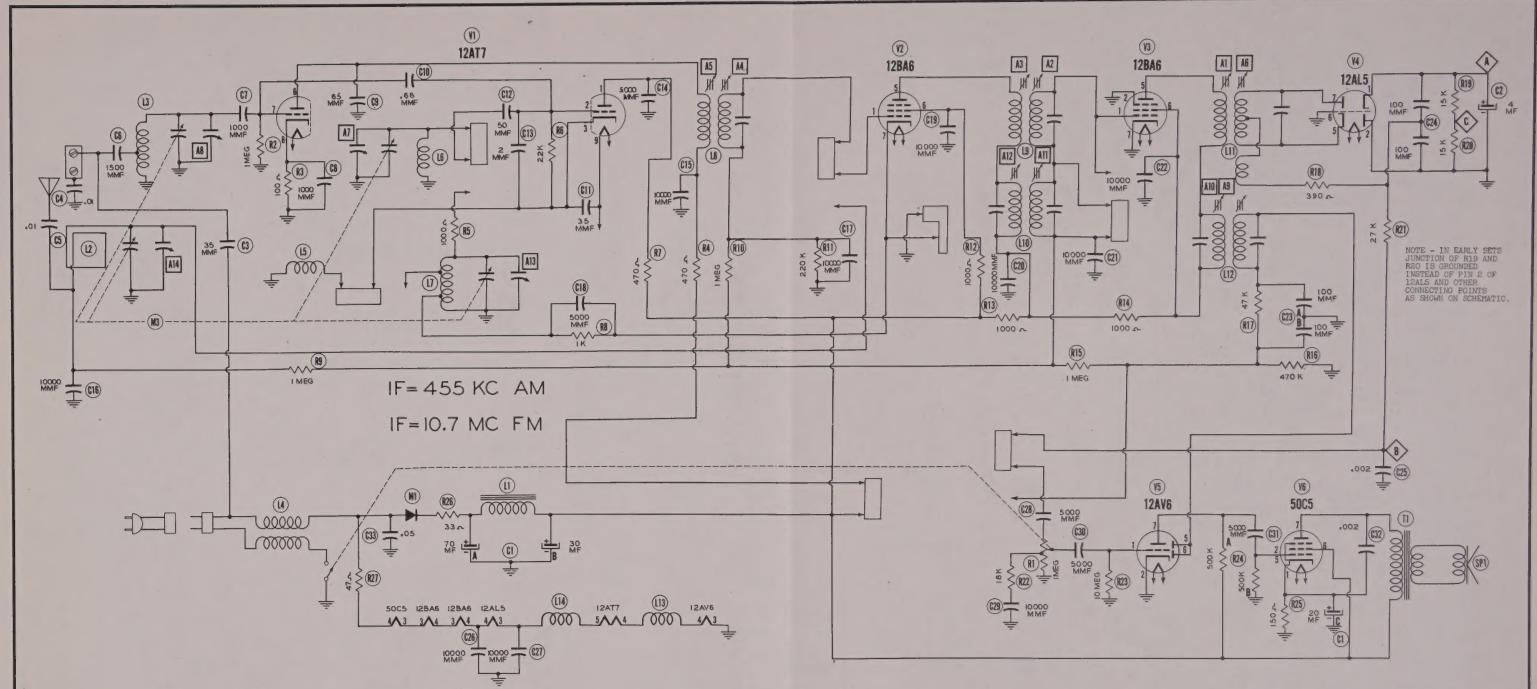
R2





BAND SWITCH SHOWN IN FM POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
	V1A	12AT7	120VDC	$-14VDC	0V	12VAC	24VAC	0V	-.6VDC	0V	16VAC
‡	V1B	12AT7	117VDC	$-.6VDC	0V	12VAC	24VAC	117VDC	-1.6VDC	.2VDC	16VAC
	V2A	12BA6	-1.1VDC	0V	61VAC	50VAC	105VDC	125VDC	6.8VDC		
‡	V2B	12BA6	-.6VDC	0V	61VAC	50VAC	65VDC	115VDC	0V		
	V3	12BA6	-.6VDC	0V	50VAC	37VAC	90VDC	80VDC	0V		
‡	V4	12AL5	.3VDC	0V	24VAC	37VAC	.1VDC	0V	.2VDC		
	V5	12AV6	-.4VDC	0V	0V	12VAC	-.5VDC	-.5VDC	85VDC		
	V6	50C5	8.2VDC	0V	61VAC	110VAC	0V	122VDC	115VDC		

TAKEN WITH VACUUM TUBE VOLTMETER.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
	V1A	12AT7	160Ω	28KΩ	2Ω	14Ω	25Ω	1 Inf.	1 Meg.	10Ω	20Ω
‡	V1B	12AT7	160Ω	28KΩ	1.5Ω	14Ω	25Ω	160Ω	2 Meg.	10Ω	20Ω
	V2A	12BA6	2 Meg.	0Ω	64Ω	51Ω	11.1KΩ	11.1KΩ	100Ω		
‡	V2B	12BA6	2 Meg.	0Ω	64Ω	51Ω	11.1KΩ	11.1KΩ	0Ω		
	V3	12BA6	800KΩ	0Ω	51Ω	39Ω	1MΩ	1MΩ	0Ω		
‡	V4	12AL5	30KΩ	0Ω	26Ω	39Ω	Inf.	0Ω	Inf.		
	V5	12AV6	10 Meg.	0Ω	0Ω	12Ω	500KΩ	500KΩ	150KΩ		
	V6	50C5	150Ω	500KΩ	64Ω	112Ω	500KΩ	112Ω	132Ω		

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
† Measured from output of M1.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer parallel with base of dial. Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.

When complete receiver alignment is to be performed, it is essential that the order given be followed. If alignment of the FM IF's is performed, the AM IF's will require realignment.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Keep signal generator output attenuated to produce approximately 1.6 volts reading on VTVM with the exception of step 5.

To avoid splitting of the heads of the iron core tuning slugs, use an insulated screwdriver with a 1/8 inch blade. Do not exert undue pressure.

Disconnect the built in FM antenna lead from the antenna terminal strip.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (Grid) of 12BA6 (V3). Low side to chassis.	10.7MC (Unmod.)	FM (counterclock-wise)	Tuning gang fully open	DC Probe to Point ◇ Common to chassis.	A1	Adjust for maximum deflection.
2.	.001MFD	High side to pin 1 (Grid) of 12BA6 (V2). Low side to chassis.	"	"	"	"	A2,A3	"
3.	20Ω carbon res.	Across FM antenna terminals with 20Ω in series with high side.	"	"	"	"	A4,A5	"
4.	A. Reduce output of signal generator until VTVM reads exactly 1.5 volts. B. Tune generator above 10.7MC until VTVM reads exactly 1 volt. Note exact frequency. C. Tune generator below 10.7MC until VTVM reads exactly 1 volt. Note exact frequency. D. Add the generator frequencies obtained in step b and c. Divide the sum of these frequencies by 2, the result is the FM IF center frequency. See figures 1 and 2 for example at curve. E. Tune the signal generator above and below 10.7MC and note the VTVM reading at various points until you have a good impression of the shape of the selectivity curve. If two peaks are obtained, note reading of each peak. If either peak is over 20% higher than the other it will be necessary to repeat steps 1 thru 4. See figures 3 thru 6 for representative curves.							
5.	20Ω carbon res.	High side thru 20Ω to FM ant. terminal. Low side to chassis.	Set gen. to the IF center freq. obtained in step "4D"	FM	Tuning gang fully open	DC Probe to Point ◇ Common to ◇ Point	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

See notes under FM IF alignment using VTVM.

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (Grid) of 12BA6 (V2). Low side to chassis.	10.7MC (450KC Sweep)	FM (counterclock-wise)	Point of inter-ference	Vert.Amp. to Point ◇ Low side to chassis.	A1,A2, A3	Disconnect stabilizer capacitor C2. Adjust for maximum amplitude and symetry as per Fig 7.
2.	20Ω carbon res.	Across FM antenna terminals with 20Ω in series with high side.	"	"	"	"	A4,A5	Adjust for maximum amplitude and symetry as per Fig 7.
3.	"	"	"	"	"	Vert.Amp. to Point ◇ Low side to chassis.	A6,A1	Reconnect capacitor C2. Adjust A6 so 10.7MC occurs at center of crossover lines as per Fig 8. SLIGHTLY retouch A1 for maximum amplitude and straightness of cross over lines. Continue with step 6.

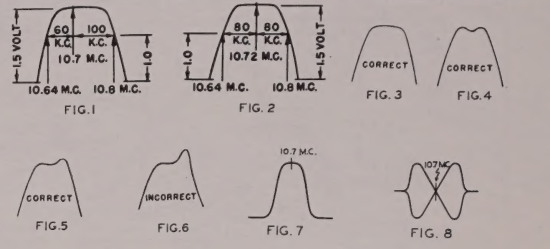
FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Two 20Ω carbon res.	Across FM antenna terminals with 20Ω in each lead.	109MC (Unmod.)	FM	Tuning gang fully open	DC Probe to Point ◇ Common to chassis.	A7,A8	Adjust for maximum deflection.
7.	"	"	87MC (Unmod.)	"	Tune for max deflection. Tuning gang should be almost closed.	"		If the signals in steps 6 and 7 will not tune in within the limits of the tuning gang, (± .5MC), expand or compress oscillator coil turns for maximum deflection and repeat steps 6 and 7.
8.	"	"	104MC (Unmod.)	"	Tune for max deflection.	"	A8	Rock tuning gang while adjusting A8 for maximum deflection. If A8 will not peak, expand or compress FM ant. coil turns. Replace set in cabinet & check calibration. If calibration error exceeds ± .5MC at any point, repeat steps 6,7, and 8.

AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
9.	250MMF	High side to stator of AM antenna section of tuning gang, (front section). Low side to chassis.	455KC (400∿ Mod.)	AM (clockwise)	Tuning gang fully open	Across voice coil	A9, A10, A11, A12	Adjust for maximum output.
10.	250MMF	"	1620KC (400∿ Mod.)	"	"	"	A13	"
11.		Loop	1400KC (400∿ Mod.)	"	Tune for max output	"	A14	Fashion loop of several turns of wire and radiate signal into loop of rcvr. Adjust for maximum output.



PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL Part No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	FM Converter-AM Osc.	12AT7	12AT7	9A	
V2	FM 1st IF Amp.-AM Mixer	12BA6	12BA6	7BK	
V3	FM 2nd IF Amp.-AM IF Amp.	12BA6	12BA6	7BK	
V4	Ratio Det.	12AL5	12AL5	6BT	
V5	DET.-AVC-AF	12AV6	12AV6	7BT	
V6	Power Output	50C5	50C5	7CV	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ADMIRAL Part No.	AEROVOX Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	SPRAGUE Part No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	70	150	67C 7-14	†AF868D4A § UPR5150/30	UP8415C		†5EL-343 § UT-301	■ Filter ▲ Filter
B	30	150						
C	20	25						Output Plate Bypass
C2	4	50	67A 4-8	PM3150/4	BR50		TVA-13	Stabilizing Cap.
C3	35		65B 6-57	1468-00004	5W524	GP1K-33	1FM-44	FM Line Ant. Coupling
C4	.01	400	64B 1-25	P488-01	07481	GP2-335-01	TM-11	FM Ant. Isolation
C5	.01	400	64B 1-25	P488-01	07481	GP2-335-01	TM-11	Ant. Coupling Note 1
C6	1500		65B 9-83	1467-0015	1W5D15	GP2L-0015	1FM-215	FM Ant. Coupling
C7	1000		65B 9-31	1468-001	1W5D1	GP2L-001	1FM-21	RF Coupling
C8	1000		65B 9-31	1468-001	1W5D1	GP2L-001	1FM-21	FM RF Cathode Bypass
C9	65	500	65B 1-27					Fixed Trimmer
C10	.68		65A 16-1					Osc. Coupling
C11	35		65B 6-57	1468-00004	5W524	GP1K-33	1FM-44	FM Conv. Fil. Bypass
C12	50	500	65B 6-4	1468-00005	5W525	GP1K-50	1FM-45	Osc. Grid Cap.
C13	2		65B 6-58					Osc. Feedback
C14	5000		65A 10-1	1467-005	1D5D5	811-005	29C1	Osc. Plate Bypass
C15	10000		65A 10-3	P488-01	07481	821-01	36C1	FM Conv. Plate Dec.
C16	10000		65A 10-3	P488-01	07481	821-01	36C1	AVC Filter
C17	10000		65A 10-3	P488-01	07481	821-01	36C1	AVC Filter
C18	5000		65A 10-1	1467-005	1D5D5	811-005	29C1	AM Conv. Cath. Bypass
C19	10000		65A 10-3	P488-01	07481	821-01	36C1	AM Conv. Screen Bypass
C20	10000		65A 10-3	P488-01	07481	821-01	36C1	Decoupling
C21	10000		65A 10-3	P488-01	07481	821-01	36C1	AVC Filter
C22	10000		65A 10-3	P488-01	07481	821-01	36C1	FM 2nd IF Decoupling
C23A	100		Note 2	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
B	100			1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C24A	100		63A 7-1	1468-0001	5W5T1	GP1K-100	1FM-31	Diode Load Cap See Note 3
B	100			1468-0001	5W5T1	GP1K-100	1FM-31	Diode Load Cap
C25	.002	600	64B 1-14	P688-002	07D2	GP2M-002	TM-22	De-emphasis
C26	10000		65A 10-3	P488-01	07481	821-01	36C1	Ratio Det. F'il. Bypass
C27	10000		65A 10-3	P488-01	07481	821-01	36C1	Ratio Det. F'il. Bypass
C28	5000		65A 10-1	P688-005	07D5	811-005	29C1	Audio Coupling
C29	10000		65A 10-3	P488-01	07481	821-01	36C1	Tone Compensation
C30	5000		65A 10-1	P688-005	07D5	811-005	29C1	Audio Coupling
C31	5000		Note 4	P688-005	07D5	811-005	29C1	Audio Coupling
C32	.002	600	64B 1-14	P688-002	07D2	GP2M-002	TM-22	Output Plate Bypass
C33	.05	200	64B 1-52	P688-05	07D5		TM-15	Line Filter

§ Parallel sections to obtain desired capacity.
Note 1. Used only on sets with model number ending in "UL"
Note 2. Item C23A, C23B, and R17 are combined into one unit obtainable under MFGR'S Part No. 63A 3-1.
Note 3. When either item C24A or C24B are replaced, replace both with capacitors of equal value.
Note 4. Item C31, R24A and R24B are combined into one unit obtainable under MFGR'S Part No. 63A 5-2.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: ADMIRAL Part No.	IRC Part No.	CLAROSTAT Part No.	INSTALLATION NOTES
R1A	1 Meg.	½	76B2-14	Q19-137X	A7-112	Volume control, tapped @ 500KΩ
B	Shaft			Not Req.	KSS-3	Attach to R1A per instructions.
C	Switch			76-1	SW-A	Attach to R1A per instructions.

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

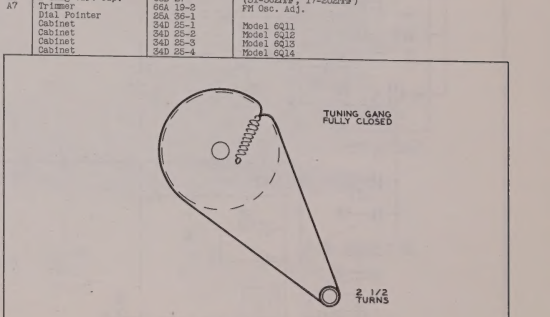
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ADMIRAL Part No.	REPLACEMENT DATA: MEISSNER Part No.	
L2	AM Loop Ant.	2Ω	1Ω	69C 97		
L3	FM Ant.	2Ω		69A 103		
L4	FM Ant.Line	2Ω	2Ω	69A 102		
L5	RF Choke	1.1Ω		73A 6-2		
L6	FM Osc.	2Ω		69A 104		
L7	AM Osc.	5Ω		69A 105-1	14-1060	
L8	1st FM IF	.8Ω	2Ω	72B 89		
L9	2nd FM IF	2.7Ω	2Ω	72B 90		
L10	1st AM IF	10Ω	2Ω	72B 91		
L11	Ratio Det.	2Ω	.1Ω	72B 39		
L12	2nd AM IF	9Ω	9Ω	72B 74	16-6678	
L13	F'il. Choke	1.1Ω		73A 6-2		
L14	F'il. Choke	1.1Ω		73A 6-2		

SELENIUM RECTIFIER

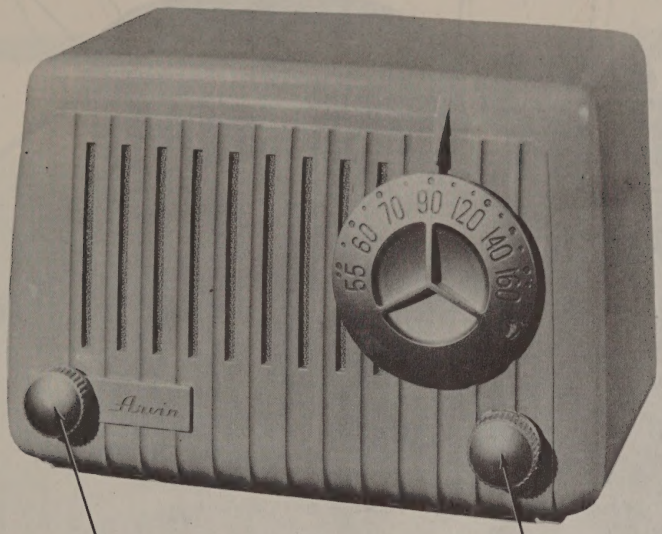
ITEM No.	RATING CURRENT	REPLACEMENT DATA: ADMIRAL Part No.	REPLACEMENT DATA: SYLVANIA Part No.	NOTES
M1	.075A	93A 1-2	HC-5	

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL Part No.	NOTES
M2	Switch	77B 27	Band
M3	2 Gang Var. Cap.	68B 27	(31-562MMF, 17-202MMF)
A7	Trimmer	66A 19-2	FM Osc. Adj.
	Dial Pointer	28A 36-1	
	Cabinet	34D 25-1	Model 6Q11
	Cabinet	34D 25-2	Model 6Q12
	Cabinet	34D 25-3	Model 6Q13
	Cabinet	34D 25-4	Model 6Q14



ARVIN MODELS
356T, 357T (Ch. RE-273)



VOLUME CONTROL
ON-OFF SWITCH

TUNING CONTROL

ARVIN MODELS
356T, 357T (Ch. RE-273)

ARVIN MODEL 356T

TRADE NAME	Arvin, Models 356T, 357T (Ch. RE-273)
MANUFACTURER	Noblitt-Sparks Industries Inc., Columbus, Indiana
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 12SA7GT Converter, 12SK7 IF Amp., 12SQ7GT DET-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING: .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 8 (Grid) of 12SA7 (V1). Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1,A2, A3	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC (400~ Mod.)	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC (400~ Mod.)	Tune for maximum signal.	"	A5	Rock tuning gang and adjust for maximum output.
4.		Loop	1000KC (400~ Mod.)	"	"		Bend tuning gang plates for maximum output.
5.		Loop	600KC (400~ Mod.)	"	"		Bend tuning gang plates for maximum output. Check calibration at 1400KC, 1000KC, and 600KC.

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PARTS LIST AND DESCRIPTIONS

ARVIN
MODEL 356T

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		ARVIN PART No.	STANDARD REPLACEMENT		
V1	Converter	12SA7GT	12SA7GT	8AD	
V2	IF Amp.	12SK7	12SK7	8N	
V3	DET-AVC-AF	12SQ7GT	12SQ7GT	8Q	
V4	Power Output	50L6GT	50L6GT	7AC	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	40	150	C22015	PRSA-86D4A	EDL-4215		TA-305	Filter Red
B	20	150			C			Filter Blue See Note 1
C	20	25						Output Cathode Bypass Green
C2	20	150		PRS150/20	BR2015		UT-201	Filter See Note 2
C3	1000		C20226-102	1468-001	1W5D1	GP2L-001	1FM-21	Ext. Ant. Isolation
C4	.05	200	C20067-503	P288-05	GT2S5		TM-15	AVC Filter
C5	50		A21643	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Grid Cap.
C6	.01	400	C20068-103	P488-01	GT4S1	GP2-335-01	TM-11	IF Plate Decoupling
C7	250	500	C20325-251	1469-00025	5R5T25	GP2K-250	MS-325	Fixed Trimmer
C8	50	500	C20065-500	1468-00005	5W5Q5	GP1K-50	1FM-45	IF Coupling
C9	220		C20226-221	1468-00025	5W5T25	GP2K-220	1FM-325	Diode RF Filter
C10	220		C20226-221	1468-00025	5W5T25	GP2K-220	1FM-325	Diode RF Filter
C11	.01	400	C20068-103	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C12	220		C20226-221	1468-00025	5W5T25	GP2K-220	1FM-325	AF Grid Bypass
C13	220		C20226-221	1468-00025	5W5T25	GP2K-220	1FM-325	AF Plate Bypass
C14	.005	600	C20069-502	P688-005	GT6D5	GP2M-005	TM-25	Audio Coupling
C15	.01	400	C20068-103	P488-01	GT4S1	GP2-335-01	TM-11	Output Plate Bypass
C16	.05	400	C20068-503	P488-05	GT4S5		TM-15	Line Filter

Note 1. Some models use 30MFB in this application.
Note 2. Not used in all models.

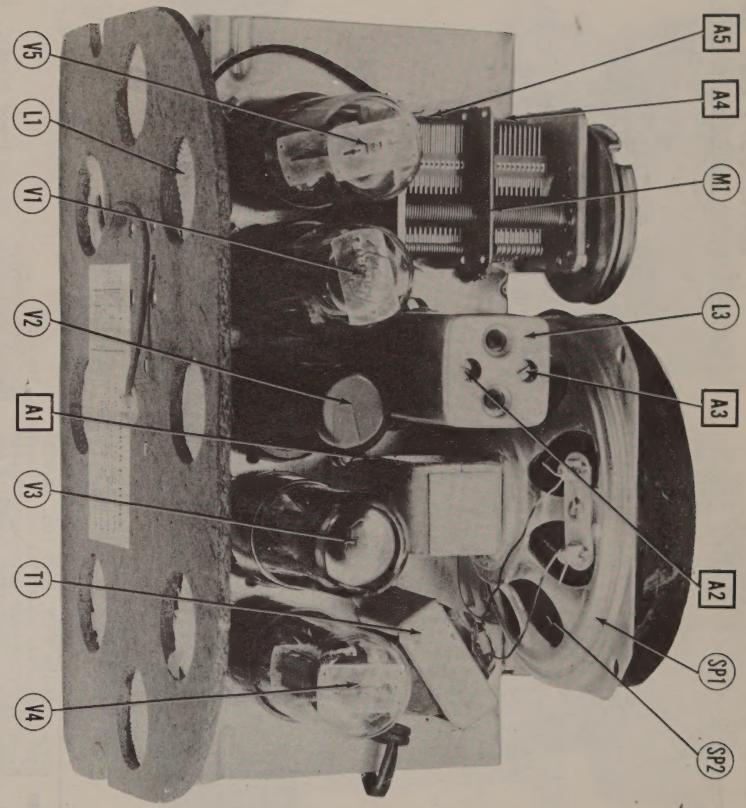
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	
R1A	2 Meg.	½	C21947	Q13-139	AM-66-Z	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	
R2	22KΩ	½	C20060-223	BTS-22K	Osc. Grid
R3	1000Ω	½	C20060-102	BTS-1000	IF Plate Decoupling
R4	100KΩ	½	C20060-104	BTS-100K	Diode Load
R5	47KΩ	½	C20060-473	BTS-47K	Diode Filter
R6	2.2 Meg.	½	C20060-225	BTS-2.2 Meg.	AVC Network
R7	4.7 Meg.	½	C20060-475	BTS-4.7 Meg.	AF Grid
R8	470KΩ	½	C20060-474	BTS-470K	AF Plate
R9	470KΩ	½	C20060-474	BTS-470K	Output Grid
R10	150Ω	½	C20060-151	BW-½-150	Output Cathode
R11	1200Ω	1	C20070-122	BW-1-1200	Filter
R12	22Ω	1	C20070-220		Surge Limiter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ARVIN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	2300Ω	3.5Ω	185Ω Tap @ 8Ω	.5Ω	AC22134-1	A-3330	A-3031	RO-3	

SPEAKER

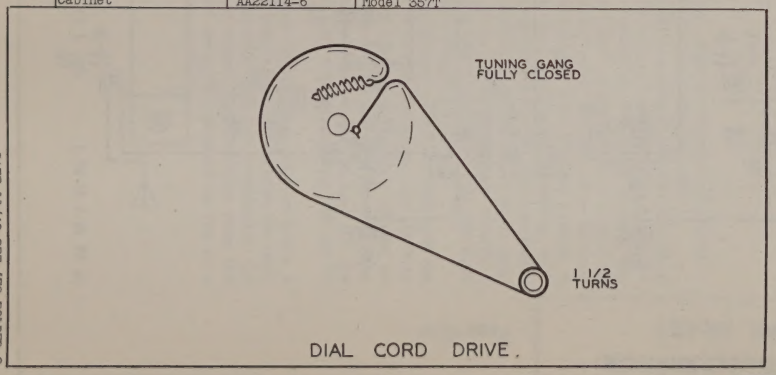
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-113		
SP1	PM	3.5Ω	C21946	MOD.P4-X	4A07	
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	
L1	Loop Ant.	0Ω	1Ω	AC21998-1		Includes rear cover assembly.
L2	Osc. Coil	.8Ω	6Ω	AC22024	14-1060	
L3	Input IF	23Ω	23Ω	AC22695-1	16-6658	
L4	Output IF	12Ω		A22616		

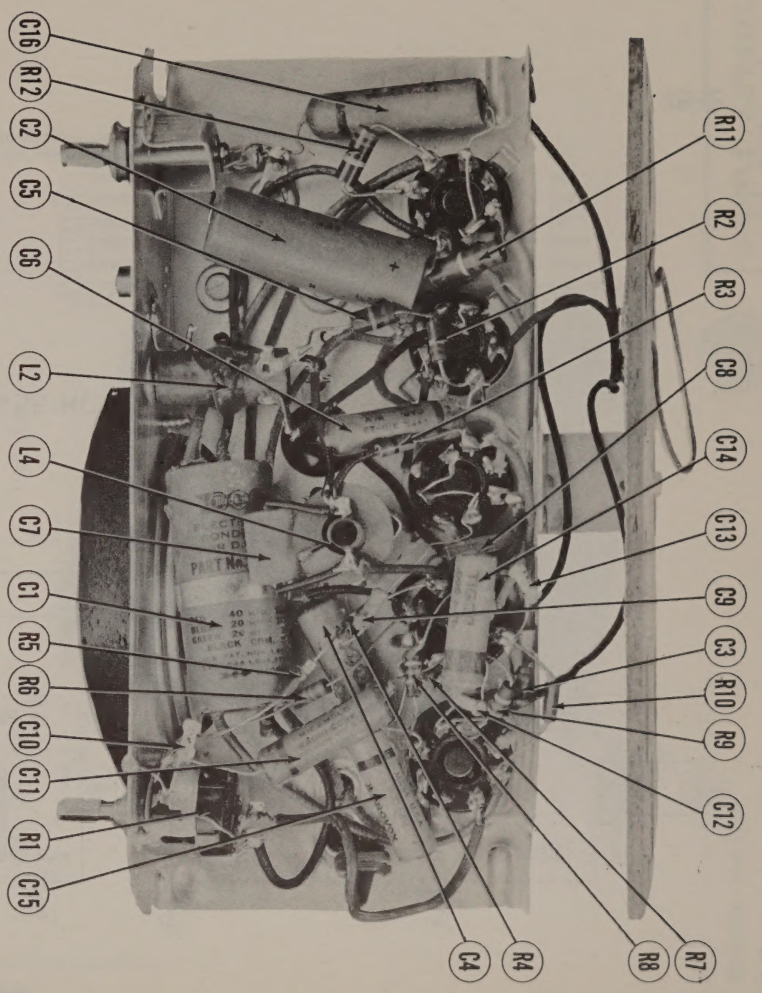
MISCELLANEOUS

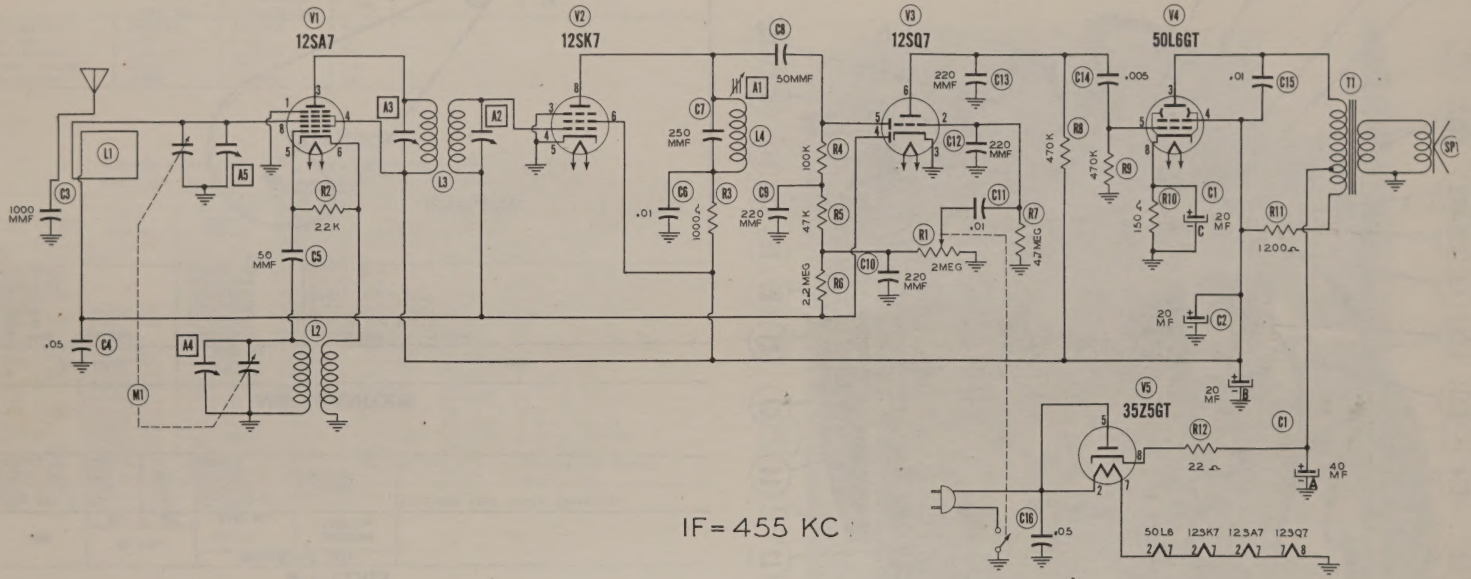
ITEM No.	PART NAME	ARVIN PART No.	NOTES
M1	2 Gang. Var. Cap.	AC22694-1	(15-398MMF, 31-202MMF)
	Knob	A21993-5	Volume and tuning
	Knob	AA22115-5	Dial, Model 356T
	Knob	AA22115-6	Dial, Model 357T
	Cabinet	AA22114-5	Model 356T
	Cabinet	AA22114-6	Model 357T



DIAL CORD DRIVE.

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7GT	0V	25VAC	95VDC	95VDC	5-7VDC	0V	12VAC	-.6VDC
V 2	12SK7	0V	36VAC	0V	-.6VDC	0V	95VDC	25VAC	82VDC
V 3	12SQ7GT	0V	-.8VDC	0V	-.6VDC	-.6VDC	50VDC	12VAC	0V
V 4	50L6GT	117VAC	84VAC	117VDC	95VDC	.1VDC	0V	36VAC	6VDC
V 5	35Z5GT	124VDC	117VAC	110VAC	124VDC	117VAC	95VDC	84VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7GT	0Ω	24Ω	†1.2KΩ	†1.2KΩ	22KΩ	.5Ω	12Ω	4.2Meg.
V 2	12SK7	0Ω	36Ω	0Ω	4.2 Meg.	0Ω	†1.2KΩ	24Ω	12.2KΩ
V 3	12SQ7GT	0Ω	4.7 Meg.	0Ω	4.2 Meg.	2 Meg.	147OKΩ	12Ω	0Ω
V 4	50L6GT	120Ω	85Ω	1200Ω.	†1.2KΩ	470KΩ	Inf.	36Ω	150Ω
V 5	35Z5GT	50KΩ	120Ω	110Ω	50KΩ	120Ω	50KΩ	85Ω	50KΩ

† Measured from pin 8 of V5

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FIGURE 1

INTRODUCTION

1. Although at first glance the tape recorder may appear to be a complicated instrument, closer inspection will show that it is neither as complicated mechanically as an automatic record changer nor as complicated electrically as a superheterodyne receiver.

2. Fundamentally, the art of a magnetic recording is old, dating from the last century. A magnetic recording consists of a varying degree of magnetization of any convenient form of signal carrier which can be magnetized and maintain the magnetized state, as well as being mechanically stable. In the SOUNDMIRROR, this material is a strong paper tape or ribbon, .248 inches wide maximum, on which a magnetic coating has been applied.

3. This paper tape is moved at a varying rate of speed, depending on whether the low speed capstan (144A) or the hi speed capstan (144B) is used. This tape moves through a magnetic field which acts on this coating to produce a record in the form of the different amounts of magnetization. In the playback process the tape is moved at the same rate of speed past a pickup coil; a voltage proportional to the magnetization is generated in the pickup coil and is amplified in a conventional amplifier so that it may be reproduced through a speaker.

4. Much as the grid bias is used in a vacuum tube, a bias current is mixed with the signal current when a recording is made. In the BK403, a 30 KC bias having an amplitude of approximately twice that of the peak amplitude of the signal current is used. It is very important that this bias be present, since its absence will cause a distorted recording which cannot be corrected.

5. A magnetic recording is unique in that the recording material is not physically or mechanically changed in the recording or playback processes. For this reason, the recording may be played back many times, or erased by a demagnetization process so that the tape may be used countless times for recordings. This erasing process is similar to the recording and consists of recording, with the bias only, at such a high level that all previous information on the tape is cancelled out and the average magnetic state of the tape is as it was before any recording was made on it. Anything which interferes with this high power bias will result in incomplete erasing.

6. The erase head is so placed on the recorder that the tape passes through it before the recording head. Erasure takes place automatically as recording occurs so that no special step is necessary. As will be noted in the operation instructions, the procedure for setting the unit for the erase-record processes is such that a recording will not be inadvertently erased.

7. As this unit employs motors and vacuum tubes, a considerable amount of heat is generated within the unit; therefore, in order to provide sufficient ventilation, the unit should be placed no closer than six inches from the nearest wall and should never be operated on top of a radiator or near a warm air outlet.

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OPERATING INSTRUCTIONS

Recording

1. To prepare the SOUNDMIRROR for recording:

(a) Insert the line cord plug into a convenient wall receptacle of the proper rating.

(b) Turn the power switch (93) to the "ON" position.

(c) Place a full reel of tape on the supply reel turntable (128) so that the tape will feed from the reel as indicated by the arrow on the panel.

(d) Place an empty reel on the take-up reel turntable (137) and feed the end of the tape up through one of the radial slots in the reel. Hold the end of the tape and rotate the reel in a counterclockwise direction four or five revolutions. The tape should now be firmly fastened to the take-up reel. The black coating of the tape should face inward on the supply reel and outward on the take-up reel.

(e) Hold the take-up reel and pull a sufficient amount of tape from the supply reel to go through the heads (98), around the capstan (144A or 144B), and past the forward limit switch (96). Follow the arrows on the panel. The black coating of the tape should bear against the pole pieces of the two heads (98).

(f) Turn the Record-Play switch (94) to the record position.

(g) If a microphone recording is to be made, connect the Brush model BA-106 crystal microphone which is supplied with the unit to the microphone jack (138).

(h) If a recording from a radio receiver is desired, it is recommended that the detector circuit of the radio be connected to the high impedance input jack as shown in Figure (8) on the right hand side of the SOUNDMIRROR. It is possible to make this connection across the radio speaker voice coil, but the low impedance jack should be used making sure the switch (HI-LO) is in low position.

(i) Depress the Record pushbutton (97E) and adjust the signal level, by means of the Record Volume Control (41), until the indicating tube (4) almost closes on peak passages.

(j) Depress both the Record (97E) and the Forward (97A) pushbuttons so that both lock in the depressed position.

(k) Momentarily depress the Start pushbutton (97C) to start the drive mechanism and begin the recording.

(l) The Stop pushbutton (97D) is used to stop the recording process.

To Rewind

2. (a) Fasten the tape to the supply reel by feeding the end of the tape up through one of the radial slots in the reel and holding the end while rotating the reel for four or five revolutions in a counterclockwise direction. The tape should now be firmly fastened to the supply reel, and the black-coated surface should be toward the center of the supply reel.

(b) Place the tape in the slot of the Reverse Limit switch (95). This switch controls the dynamic braking applied upon completion of the rewinding or if the tape should break.

(c) Depress the Reverse pushbutton (97B). The tape will now completely rewind and automatically stop when the rewinding is complete. If desired, the operator may stop at any point by depressing the Stop pushbutton (97D).

Never attempt to stop fast-moving reels by hand.

To Play a Recording

3. (a) Insert the line cord plug into a convenient wall receptacle of the proper rating.

(b) Turn the power switch (93) to the "ON" position.

(c) Place the reel containing the desired recording on the supply reel, or left hand turntable, so that the tape will feed from the reel as indicated by the arrow on the panel.

(d) Place an empty reel on the take-up reel, or right hand turntable, and feed the end of the tape up through one of the radial slots in the take-up reel. Hold the end of the tape and rotate the take-up reel in a counterclockwise direction four or five revolutions. The tape should now be firmly fastened to the take-up reel. The black coating should face inward on the supply reel and outward on the take-up reel.

(e) Hold the take-up reel and pull a sufficient amount of tape from the supply reel to go through the heads (98), around the capstan (144A or 144B), and past the Forward switch (96). Follow the arrows on the panel. The black coating of the tape should bear against the pole pieces of the two heads (98).

(f) Turn the Record-Play switch (94) to the "Play" position.

(g) Depress the Forward pushbutton (97A).

(h) Momentarily depress the Start pushbutton (97C) to start the drive mechanism.

(i) Adjust the volume by means of the Play Volume control (40), and the tone by the tone control (42).

(j) The Stop pushbutton (97D) is used to stop the SOUNDMIRROR when playing a record; however, the unit will automatically stop upon completion of a record or in case the tape should break.

To Start Playback at Advanced Position

4. If it is desired to begin to play a recording at an advanced position on the reel, or to skip a portion of a reel, it may be done by allowing the tape to wind directly from the supply reel to the take-up reel. When the heads and capstan are thus bypassed, the tape will wind at a high rate of speed. The Forward pushbutton (97A) is depressed and the Start pushbutton (97C) held down until the approximate position is reached. Braking is provided by pushing the Reverse pushbutton (97B). After the reels have come to a stop, the Stop pushbutton (97D) should be pressed to relieve the brake. Never attempt to stop fast-moving reels by hand.

It is suggested that colored Scotch tape be used to mark the tape to show the desired divisions or passages.

To Repair or Splice Tape

5. In case the tape is broken accidentally, or it is desired to edit the recording, a splice may be made with Scotch tape. Do not use medical adhesive tape as the adhesive material is not suited for this purpose. The Scotch tape should be applied to the reverse, or uncoated, side of the recording tape. The edges of the splice should be trimmed with a small pair of scissors, or a knife, to bring the width of the splice to that of the rest of the recording tape so it will pass through the heads without interference.

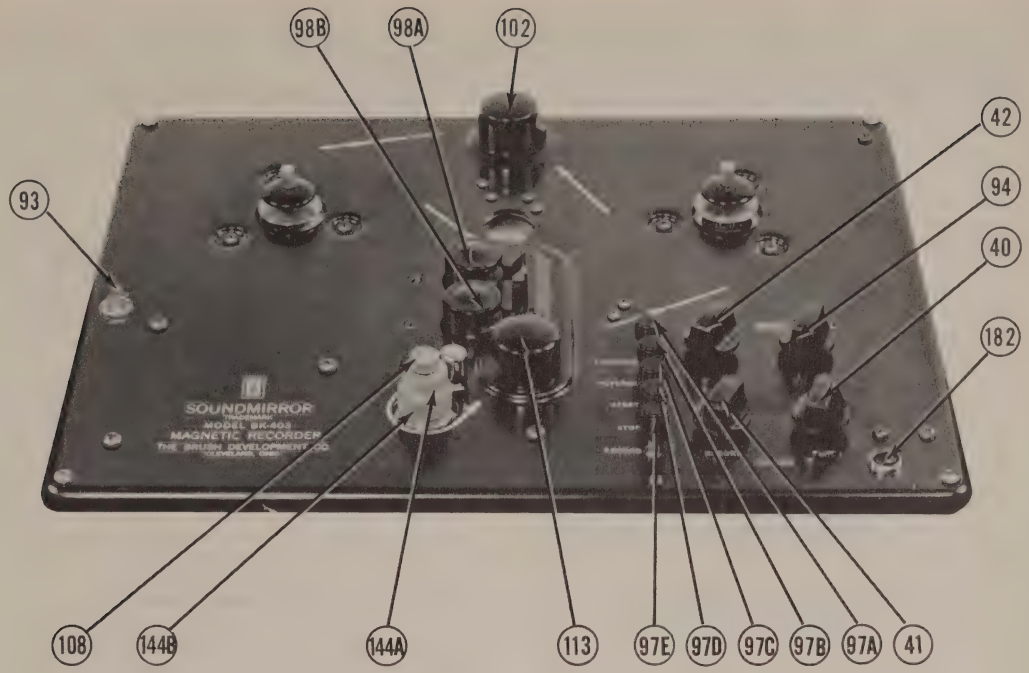

FIGURE 2—PANEL TOP VIEW—AMPLIFIER UNIT REMOVED

MECHANICAL OPERATION AND ADJUSTMENT

1. The function of the mechanical section of the SOUNDMIRROR is to deliver the tape at a uniform rate of speed past the erase and record-reproduce heads. It also provides reels for convenient handling of the lengthy tape and a means of rewinding the tape. In order to insure that the proper rate of speed be maintained, it may be necessary to make some of the adjustments outlined in the following.

Supply Reel Brake

2. This brake applies friction to the supply turntable so that, during recording or playback, a tension is maintained on the tape between the supply reel and the heads. The tension is necessary to prevent the tape from being supplied faster than it passes through the heads. If it is insufficient, the tape will spill and tangle; if it is excessive, the rate of speed of the tape will be too slow and uneven. The brake pressure is adjusted by bending the body of the spring brake (126). The force necessary to rotate the supply reel should be from .75 to 1.0 inch-ounces. It may be measured by winding from ten to twelve turns of a short length of tape around an empty reel. Place the reel on the supply shaft and use a small scale (spring balance) fastened to the end of the tape to measure the force.

3. If the felt pads become loosened from the metal, it will be necessary to replace the entire brake assembly. These pads are secured with a special cement and are not replaceable in the field.

Limit Switches

4. The purpose of the Forward Limit switch (96) is to automatically bring the unit to a stop upon the completion of a reel, or accidental breaking of the tape, when recording or playing a record. The Reverse Limit switch (95) serves to automatically halt the unit when a reel has finished rewinding, or if the tape should accidentally break during rewinding. Failure of the Limit switches to function properly will result in tape spillage and may interfere with the tape travel. If either Limit switch is loosened or removed, it will be necessary to check and readjust it when remounting.

5. Fig. 3 shows the proper adjustment of either Limit switch with the small roller spring removed. Note that the main reed is not straight, but angles slightly from the body of the switch. The contacts should be barely touching, as shown, and will be held open when the roller spring is in place. The Forward Limit switch should act when the reed is ⅛ inch from the end of its travel in either opening or closing directions. The Reverse Limit switch should be adjusted to act as the point shown in Figure 6. A maximum pressure of 14 grams (approximately ½ ounce) should be required to bring the switch over its null point, and a minimum of 4 grams (approximately 1/7 ounce) to hold, as measured at point where the actuator contacts the reed. Adjustment of either Limit switch is accomplished by loosening the screws which hold the switch to the panel and repositioning on the panel. All adjustment should be made when the switches are cool to minimize temperature effects. If the roller spring is removed, it should be replaced in exactly the same position as it was, on the mounting bracket side of the switch and with the con-

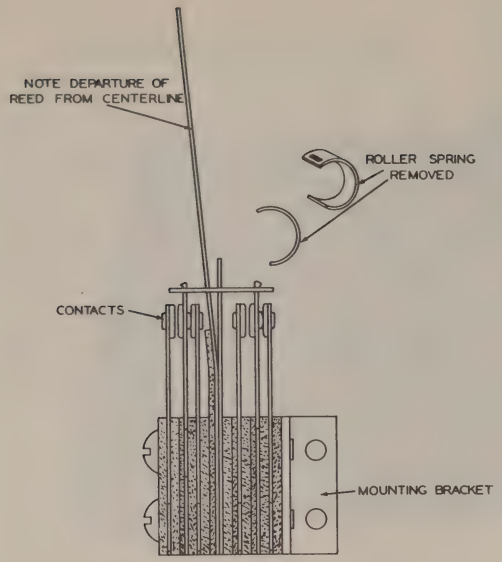

FIGURE 3—LIMIT SWITCH

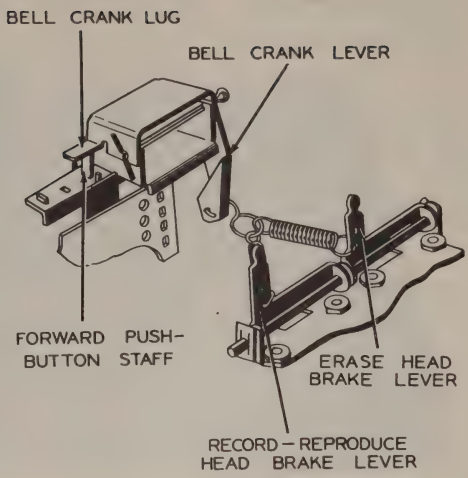

FIGURE 4—HEAD BRAKE

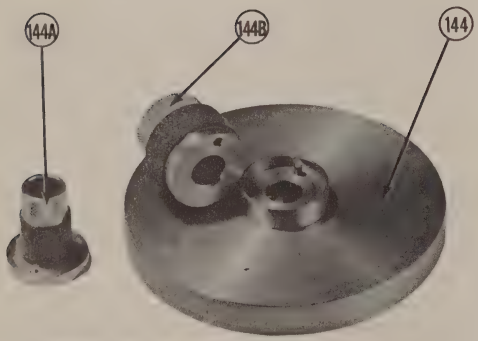

FIGURE 5—CAPSTAN-FLYWHEEL ASSEMBLY

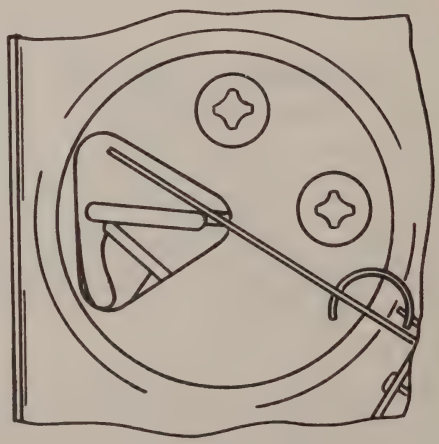

FIGURE 6—REVERSE LIMIT SWITCH

vex side of the spring away from the reed and toward the mounting bracket. The amount of overtravel should be checked to see that it is not great enough to reopen the switch contacts.

6. The Limit switch actuators should be carefully adjusted so that the tape rides on the Limit switch cover when in motion. The tape should carry the actuator until, at the end of the actuator travel, the actuator is inside the cover and prevented from coming out by the tape. In some cases, it may be necessary to clear the paint from the actuator pivot holes to allow the actuator to move freely. If the Forward switch actuator is not properly adjusted, it may cause flutter and distortion. This is caused as the actuator chatters and repeatedly pushes against the tape, causing speed variation. In extreme cases the switch may chatter enough to interrupt the motor circuits. Proper adjustment of the actuator is such that it contacts the tape at enough of an angle to insure rapid and sure action. If the actuator meets the tape at an angle too near 90°, it may cause chatter.

7. If the tape does not freely enter the Reverse Limit switch guide, when rewinding, it may be necessary to remove burrs from the edge of the guide. The Limit

switch covers are not interchangeable and if the covers are removed, they should be replaced in their proper position. If the Forward cover is used in the reverse position, the tape will not enter the reverse guide.

Head Brakes

8. The erase and record-reproduce head brakes (133, 134) have a two-fold purpose. They keep the tape in proper contact with the heads and also keep a constant pressure against the tape to aid in maintaining the constant rate of tape travel. If the head brake pressure is insufficient, poor recording or playback will result because the tape will not be in proper contact with the head pole pieces. The speed of the tape will be uneven and too rapid. If the pressure is excessive, the tape speed will be slow and uneven. The head brake adjustment is illustrated in Figure 4. The total pressure is adjusted by bending the actuating lug which extends from the bell crank assembly (141) and receives the pressure from the staff of the Forward pushbutton. Bending the lug away from the pushbutton staff decreases the pressure, and toward it increases the pressure. It is important to note that this regulates the *total* pressure applied to both heads. The portion of this total that is applied to either head is adjusted by carefully bending the bell crank arm. Bending the bell crank arm toward the erase head increases the erase head brake pressure and vice versa. The proper adjustment is such that each head brake receives exactly one-half of the total pressure. If additional adjustment is necessary, it may be obtained by bending the lower arm of either head brake toward or away from the bell crank. Bending it away from the bell crank will increase pressure. The total head brake pressure should be from 1.5 to 2.0 ounces and may be measured with a small scale (spring balance) fastened to the end of a short section of tape pulled through the heads.

9. If the felt brake pad of either head brake becomes loose it will be necessary to replace the complete brake shoe assembly (133 or 134). The felt pads are fastened with a special cement and are not replaceable in the field.

10. The most common cause of the head brakes failing to retract when the stop pushbutton (97D) is depressed, is interference with the underpanel wiring. This is easily corrected by rearrangement of the wiring. This same condition may not allow the brakes to properly contact the heads. Other causes of poor head brake operation are: Interference with the edge of the panel, which is corrected by repositioning the head assembly (98); interference with the head cover (98A or 98B), which is corrected by changing the angle of the shoe; and binding at the pivot, which is remedied by adjusting the end play in the bracket. If the angle of the shoe is to be changed, the brake assembly must be removed from the bracket before bending. After bending and replacing, the assembly must be adjusted for proper pressure. The end play in the bracket is controlled by the end play washer (127A) which may be removed or replaced with a washer of different thickness if necessary.

Drive Assembly

11. The proper operation of this mechanism is extremely important to satisfactory operation of the SOUNDMIRROR. The serviceman is advised not to attempt any major repair of this assembly, but to replace it as a unit. This is because of the many points in the assembly which might cause speed variation in the SOUNDMIRROR and result in distortion. Correct tape speed is 7.5 inches $\pm 2\%$ per second.

12. The bearing felts of the drive motor (167) should be lubricated with light oil. The idler wheel (147) bearing should be lubricated sparingly with Lubriplate No. 105, as should the interface of the idler wheel bracket (155) and the drive assembly plate (153). A small amount of the Lubriplate should be used under the idler wheel adjustment washer (146). The upper surface of the capstan felt washer (156) should be coated with Beacon No. 285 grease. Extreme care should be taken to prevent oil or grease from contacting any of the drive surfaces, which include the drive motor (167) shaft, sometimes covered with a drive spring (161); the rubber tire of the idler wheel; the outer circumference of the capstan flywheel (144); and the Corprene surface (144A or 144B) of the capstan. These surfaces should not be touched after cleaning to prevent finger printing. Carbon tetrachloride is recommended as a cleaning solvent. The Corprene surface of the capstan is best cleaned when it is in motion without tape. This may be done by depressing the forward and start pushbuttons at the same time and allowing the capstan to rotate as the cleaning cloth is applied. In extreme cases, crocus cloth may be used to smooth the surface.

13. The idler wheel tension adjustment nut (158) should be adjusted so that there is barely perceptible friction between the idler wheel mounting bracket (155) and the drive assembly plate (153). The idler wheel tension adjustment spring position is critical since misplacement will cause it to interfere with the idler wheel. When replacing this spring, it should be connected to the hook on the idler wheel mounting bracket (155) first and given one turn clockwise before connecting to the lug (157A). The tension on the idler wheel should be 3 ounces.

14. If the SOUNDMIRROR has been out of operation for some time, the rubber tire of the idler wheel (147) may acquire a permanent set, or flat spot, at the point of contact with the drive motor and capstan. This condition may usually be relieved by running the unit for one-half hour or more. If this is not effective, the idler wheel should be replaced.

15. In removing the drive assembly for servicing or replacement, it will be found that it is more convenient to remove the plate mounting screws (160) on the underside of the assembly than it is to remove those holding it to the main panel.

Pushbutton Assembly

16. A standard latching type five-station pushbutton switch (97) is used. Care must be taken to see that the connecting leads do not place the terminal strip of the switch in a strain because this will cause poor contact and may even allow a contact to drop from the switch. All stations except the Start (97C) latch when depressed. If they fail to do so, it may be necessary to file the latching cam of the offending station so that it will engage the latching bar. If the switch is in poor condition, it should be replaced as a unit.

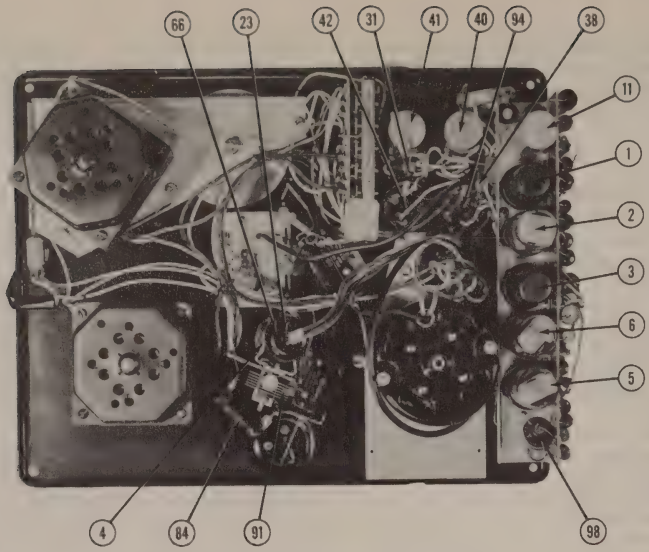

FIGURE 7—PANEL BOTTOM VIEW

MOTORS

1. The BK403 SOUNDMIRROR employs three electric motors. One is used as a take-up motor (115); one as a rewind motor (130); and one as a drive motor (167). Three different types of motors are to be found in the units. Some units may have all of one type; two of one type, and one of another; or, as shown in the exploded view on pages 8 and 9, one each of the three different types. Although nominally the same, each motor has been selected for its position in the machine because of its individual characteristics. For this reason, the motors must not be interchanged between positions. When ordering replacement motors give the part number of the motor as identified from the exploded view as well as the position of the motor in the machine. The motor shown in the exploded view as a take-up motor (115), is a part No. 206078-501; the one shown as a rewind motor (130) is a part No. 204927; and the one shown as a drive motor (167) is a part No. 201404. Remember that they may appear in different positions in other units.

2. The bearing felts of each motor should be lubricated with light oil, being careful not to get oil on the drive or brake surfaces of the unit. In some cases the motor bearings become misaligned in shipping or due to rough handling. They may usually be realigned by grasping the motor shaft and turning it while pulling upward. In extreme cases, it may be necessary to run the motor without a load for five or six hours to free up the bearings.

3. If a motor is found whose shaft has become bent because of rough handling, it is recommended that the entire motor be replaced. This condition usually causes the rotor to drag on the stator and will cause speed variation.

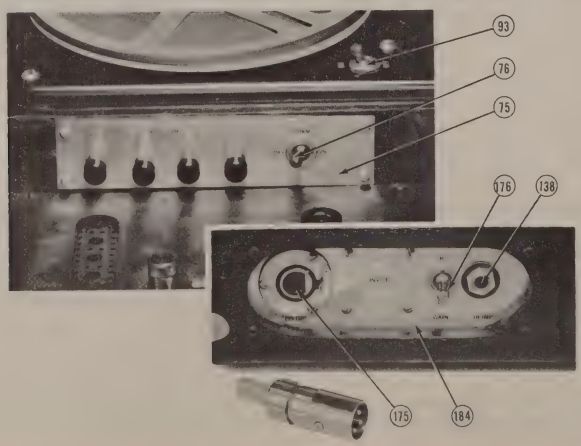

FIGURE 8—INPUT-OUTPUT PANELS

4. Some drive motors (167) have a drive spring (161) on their shaft. This spring should not be removed since it is not readily replaceable and is supplied when necessary as an integral part of the motor. Some drive motors require a hum shield (168). When replacing these motors be sure that the shield does not touch the motor laminations, and position the shield for lowest hum level in the amplifier. It may be found that the take-up motor touches the pre-amplifier chassis and causes severe hum. In this case the offending corner of the motor frame or oil retainer bar should be cut or filed to clear.

5. Misadjustment of the unit's several friction brakes, accumulation of dirt or tape coating on the capstan or limit switch, or oil or grease on the drive surfaces will all tend to make the operator think that he has one or more weak or defective motors. All these points should be checked before passing judgment on a motor.

6. Since the take-up motor (115) runs at greatly reduced speed during the recording and playback processes, it is normal that this motor become very warm. It is of a type designed to operate at high temperatures and will suffer no ill effects. The take-up reel (105) is mounted directly on the shaft of the take-up motor and will become quite warm for that reason during extended operation of the SOUNDMIRROR. This will in no way injure the tape or the reel.

7. Distortion may be caused by irregular torque of the take-up motor (115). This effect is generally caused by insufficient skew in the rotor laminations and appears only at the low speed at which this motor operates during the recording and playback processes. It may be detected by grasping the motor shaft, turning the motor on by depressing both the forward (97A) and start (97C) pushbuttons, and feeling the force needed to slowly turn the motor against its torque. This necessary force should be smooth and regular. If a "cogging" effect, or regular variation in force, is noted, the motor must be replaced.

8. Each motor is cushion mounted by means of rubber grommets and care should be taken to see that the screws which hold the motor laminations together do not touch the panel above the motor, since this will cause hum.

9. The exploded view shows one type of turntable, reel clamp or cap, and holddown screw on the supply position and another on the take-up. These differences are due to the individual type of motor and not to the position in the unit. Should the same type motor be used in both locations, for example, the associated reel handling equipment would be the same.

ELECTRONIC SYSTEM

In order to simplify the explanation of the electronic portions of the SOUNDMIRROR, the schematic diagram in figure (15) has been sectionalized with broken lines. The letters designating these sections correspond to those on the block diagram, shown in figure (16) and to the following paragraphs.

Section A—Input Amplifier

This section uses the 6SJ7 tube (1) as a high-gain amplifier stage having a grid-to-plate gain in excess of 100 times. The microphone jack (138) disconnects the radio input circuit when the microphone plug is inserted. When recording, this stage amplifies the signal from microphone or radio inputs, and when playing back, it amplifies the signal from the play head.

Owing to the high gain to this stage, a 500 Mmf. mica capacitor has been connected to grid and cathode terminals of the 6SJ7 (1), and another 500 Mmf. mica capacitor connected between the cathode terminal of this tube and the chassis ground. This is so done to eliminate rectification of a signal from a nearby powerful broadcast station and mixing it with a desired audio signal.

Section B—Play Amplifier

Half of the 6SN7 tube (2) is used as the second stage amplifier and feeds the phase inverter (Section J). When recording, this stage serves as a monitor amplifier. When playing back, it amplifies the signal from the recording medium. This stage includes the play volume control (40) and the frequency compensating circuits for play back.

Section C—First Record Amplifier

The remaining triode of the 6SN7 tube (2) is the second stage amplifier which feeds Section E. This stage includes the record volume control (41), as well as the frequency compensating circuits, for use in the recording action.

Section E—Second Record Amplifier

This is the final stage used during recording and employs a 6SJ7 tube (3).

During the recording, it supplies the audio signal to the record-reproduce head through the audio coupling capacitor (24). The 30KC bias current is introduced in this stage. It is impressed across the plate circuit of the 6SJ7 through the coupling capacitor (22), and results in a current through the recording head coil, which is a mixture (not a modulation) of the 30KC bias current and the audio frequency which is being recorded.

The 30KC potential across the recording head should range from 60 to 100 volts, as measured with an AC vacuum-tube voltmeter having a minimum input impedance of 10 megohms.

Section F—Visual Recording Indicator

A type 6E5 tube (4) is used as the volume indicator when recording. It receives an audio voltage from the screen of the 6SJ7 second record amplifier tube (3). The screen of the tube is used as the source for this indicating voltage so that the audio voltage present will be the only actuator of the volume indicator. Since the 30KC bias current is available in the plate circuit, the plate could not be used as a source of audio voltage alone for the indicator.

Section G—30KC Oscillator

The first half of the 6SN7 (5) is used as the oscillator tube. The quantity of this tube is critical and only one with a very high reading on a mutual conductance type tube tester should be employed. It may be necessary to interchange this tube with others of the same type to obtain best results. The bias current originated in this oscillator stage is, after proper amplification, used for the erasure as well as the recording bias.

A PHOTOFACT "EXPLODED" VIEW

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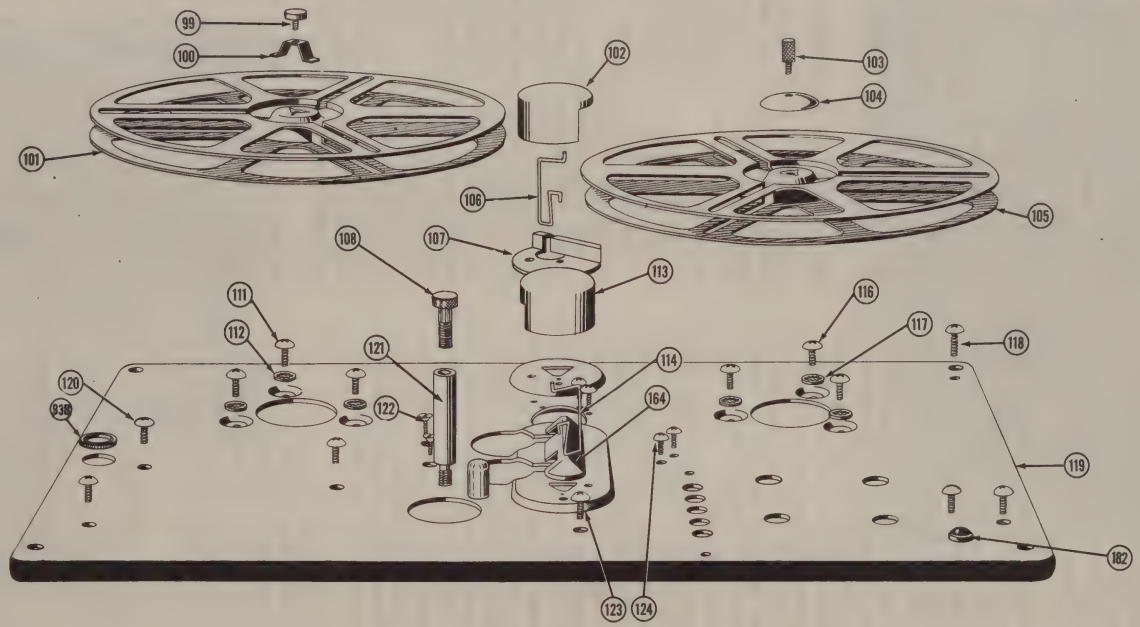

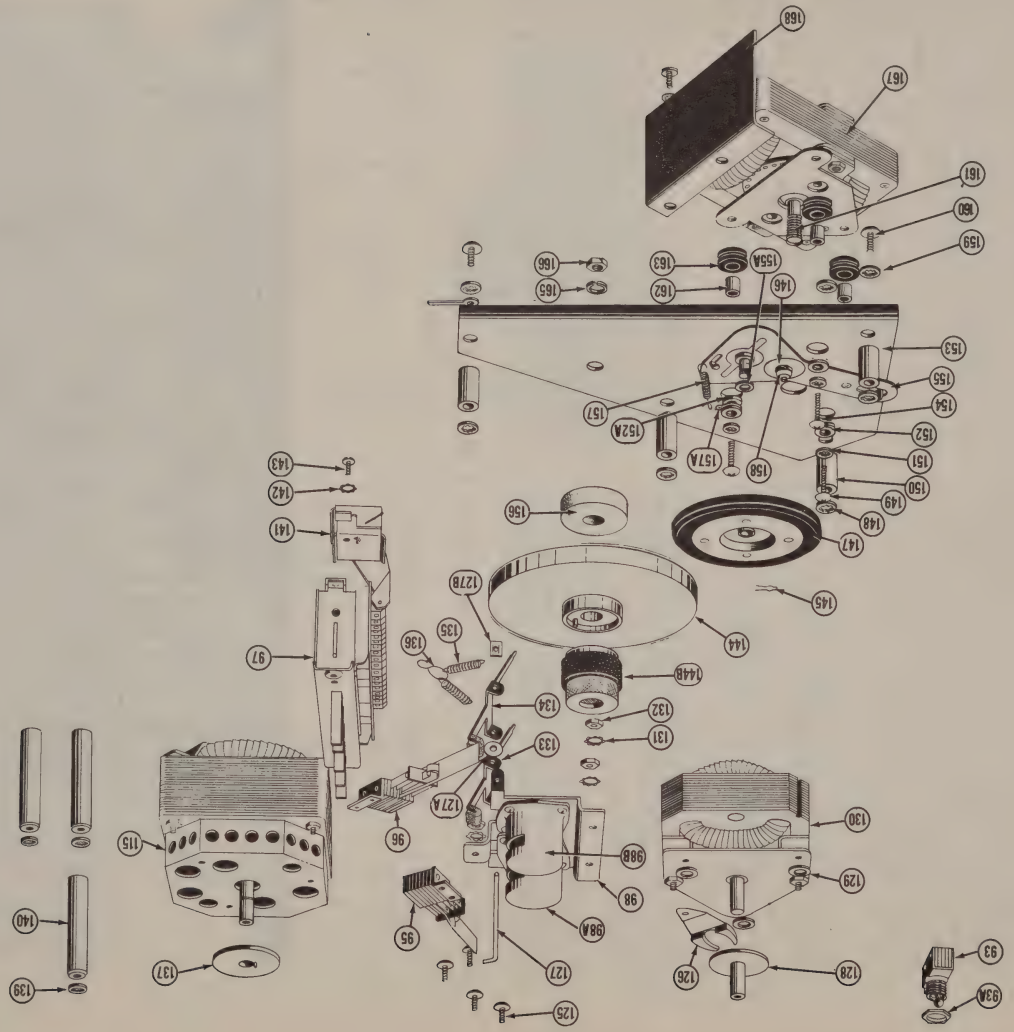
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93A

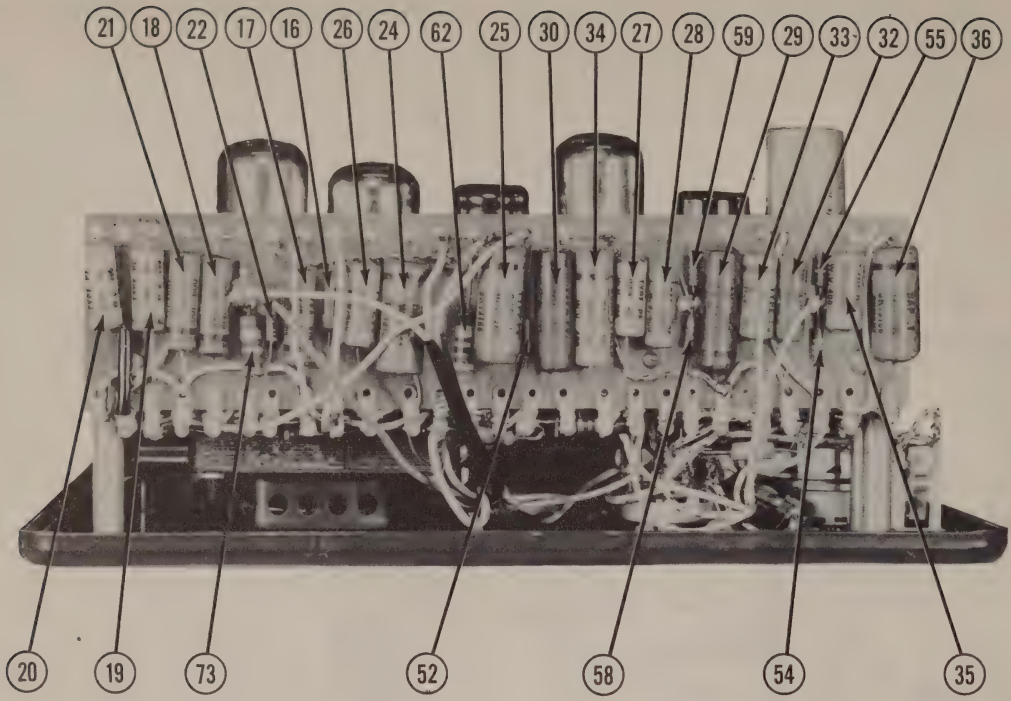

FIGURE 9—PANEL AMPLIFIER STRIP

Section H—Push-Pull Erase Amplifier

The two triodes of the type 6SN7 tube (6) are connected to form a push-pull amplifier which receives its driving signal from Section G. During the recording operation, the plate-to-plate potential in this stage ranges between 80 and 100 volts and results in a 30KC current through the erase head coil of approximately 20 ma.

Section J—Phase Inverter

This section is a conventional phase inverter stage and supplies the signal for the final amplifier stage.

Section K—Push-Pull Audio Amplifier

A type 6SN7 tube (8) is used in a conventional Class "A" push-pull audio amplifier output stage.

Section L—See Motors

Section M—Power Supply

A type 5Y3 (9) rectifier tube is employed in a conventional full-wave rectifier circuit.

Section N—Rectifier for Braking Circuit

A half-wave Selenium dry-disc rectifier is used to supply pulsating direct current for the dynamic braking operation. Some units have used the type 117Z6 rectifier tube for this purpose. When the 117Z6 is employed, the series resistor (84) value is changed from 100 to 50 ohms.

Sections P and Q—Head Assembly

1. The erase head (98A) and the record-reproduce head (98B) are mounted on the head bracket to form the head assembly. This assembly is furnished only as a unit and should either head fail, the entire assembly must be replaced. The heads are not reparable because of their construction.

2. If a new head assembly is to be installed, certain electrical changes may be necessary. The proper value for the play coil shunt capacitor (38) will be found marked on the new head assembly.

If the DC resistance of the erase head (98A) is 100 ohms, the proper value of the erase amplifier cathode resistor (74) is 680 ohms; while if its DC resistance is 70 ohms, the proper resistor value is 1,800 ohms.

3. Removal and replacement of the head assembly will necessitate adjustment of the head brakes, as outlined under "Head Brakes."

4. The surfaces of the heads upon which the tape rides, and which contain the pole pieces, are subject to an accumulation of tape coating residue, which is worn off as the tape passes. This must be periodically removed since it will cause distortion. The accumulation interferes with the proper passage of the tape and causes speed variation. It also prevents the tape from contacting the pole pieces.

5. This accumulation may be removed with carbon tetrachloride and a small cotton swab on the end of a toothpick. Care should be taken to prevent damage to the panel from the solvent. It may be necessary to to use the end of a good toothpick, or cuticle stick, to apply as an aid in removing the coating. Be careful not to mar the exposed metal pole pieces.

Section R—See Pushbutton

Paragraph 16, Mechanical Operation and Adjustment.

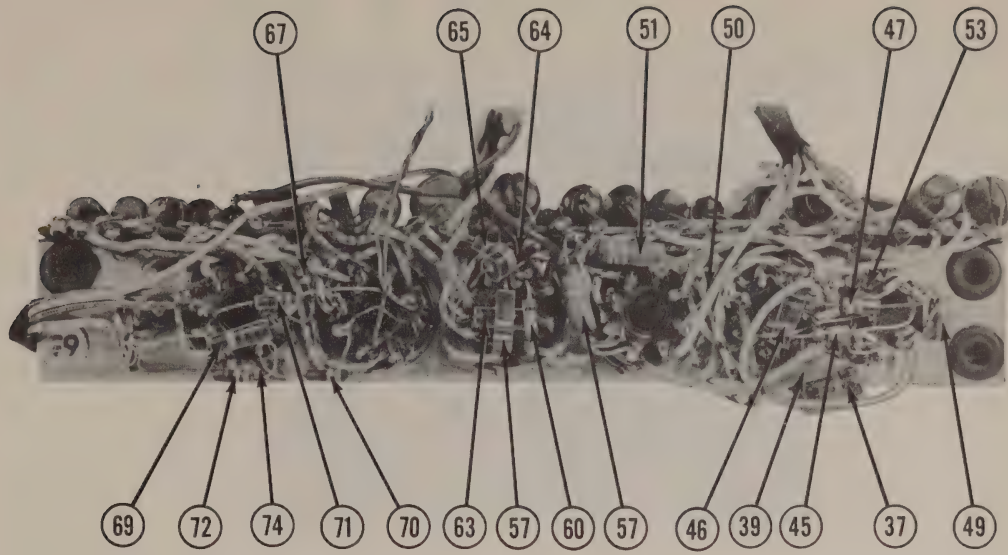

FIGURE 10—PANEL AMPLIFIER STRIP

Section S—See Limit Switches

Paragraphs 4-7, Mechanical Operation and Adjustment.

Section Y—Bias Amplifier

The 30KC signal generated in Section G is here amplified in the second half of the 6SN7 (5) and fed to the plate circuit of Section E, where it mixes with the audio signal being recorded.

Section Z—Loudspeaker

A permanent magnet dynamic speaker (88) is used. A voice coil impedance of 3.2 ohms is used. The speaker cone (89) is not replaceable.

FREQUENCY RESPONSE

1. The frequency response specifications for the Brush BK403 SOUNDMIRROR are as follows:

100 cycles 0 to —7 db
300 cycles ± 2 db
1000 cycles REFERENCE LEVEL
3000 cycles — 3 to + 5 db
5000 cycles — 12 to 5 db

The difference in response between 3000 and 5000 cycles should not be greater than + 3 to — 10 db.

2. The frequency response may be checked as follows: Insert not more than one volt audio signal through microphone jack (138). Adjust record level control (41) to set the indicating eye (4) to within 1/16" of complete closure at 1000 cycles. Without change of record level control, make a recording of the following audio frequencies: 1000, 100, 300, 3000, and 5000 cycles. Connect output meter across voice coil. Adjust play volume control (40) so that meter reads approximately one volt at 1000 cycles. Use this as reference level and read output as listed in the table above on db scale of meter.

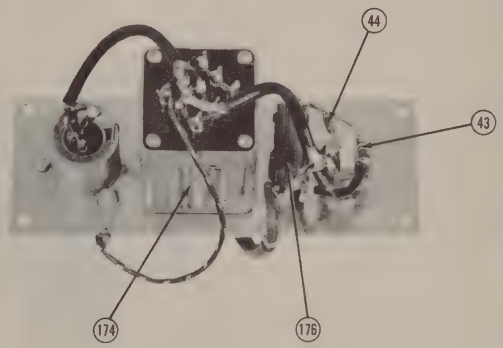

FIGURE 11—INPUT TRANSFORMER

3. The amplifier is equalized to provide more gain at the low frequencies and at the high frequencies, while the middle frequencies are attenuated. This is done to make the overall response of the recorder as flat as possible, since the response of the tape is down on the low and on the high frequencies. In Section B of the schematic, the cathode is bypassed with a small capacitor (29) to aid in high-frequency response. In this same section, the network formed by the resistor (53) and capacitor (32) is used in reproduction only to increase lows. It is shorted out during recording by a section of the record-play switch (94). The tone control (42) controls only the reproduction and monitoring responses and does not affect recording. The Section C, used only in recording, has a cathode bypass capacitor (30) to aid the high response. The network formed by resistor (58) and capacitor (28) boosts highs, while the network formed by resistor (59) and capacitor (34) boosts lows.

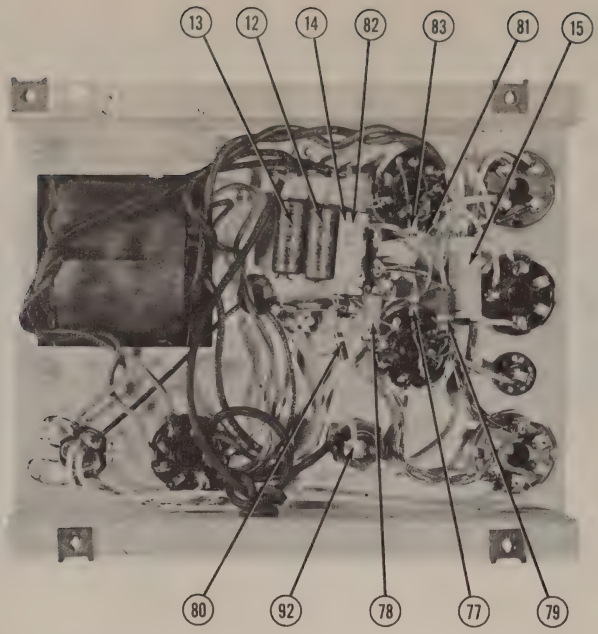

FIGURE 12—AMPLIFIER CHASSIS BOTTOM VIEW

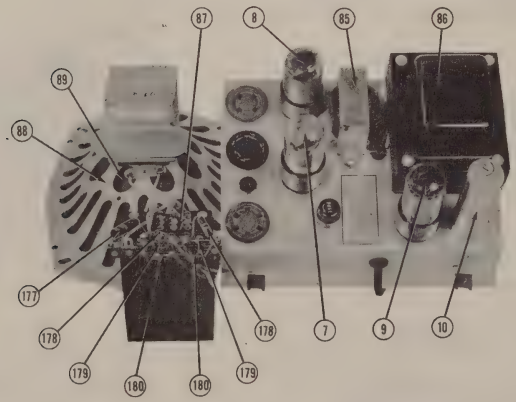

FIGURE 13—AMPLIFIER CHASSIS TOP VIEW

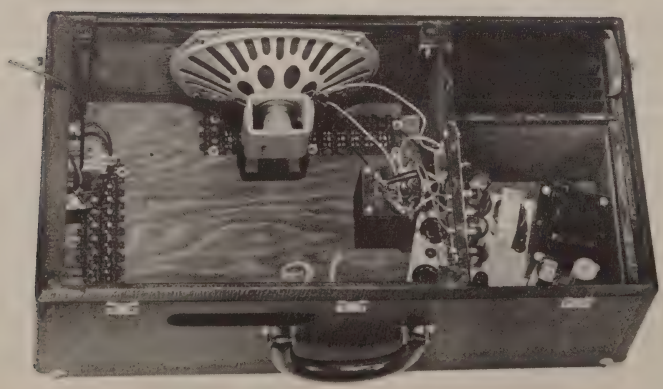

FIGURE 14—AMPLIFIER CHASSIS POSITION

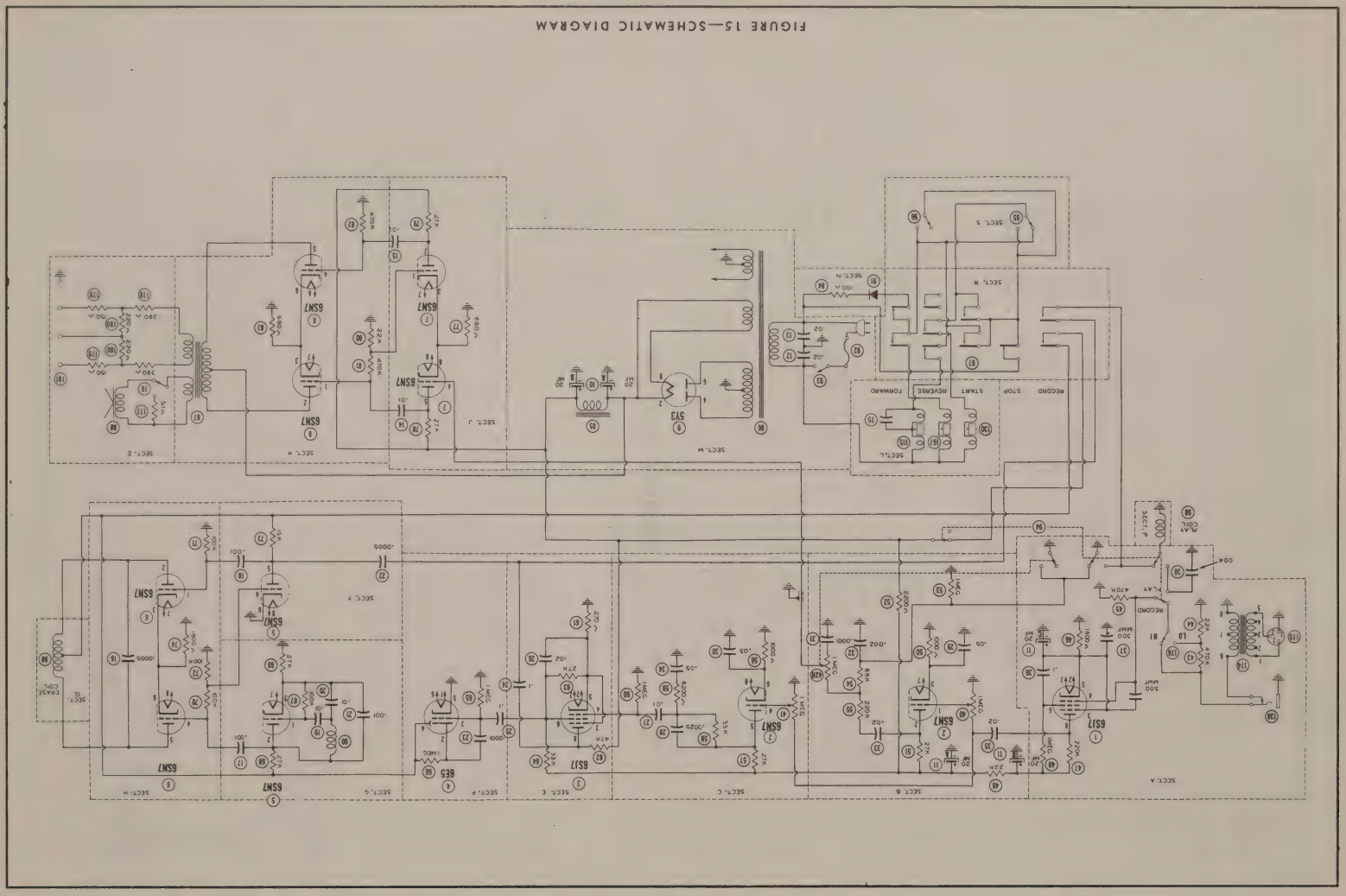

FIGURE 15—SCHEMATIC DIAGRAM

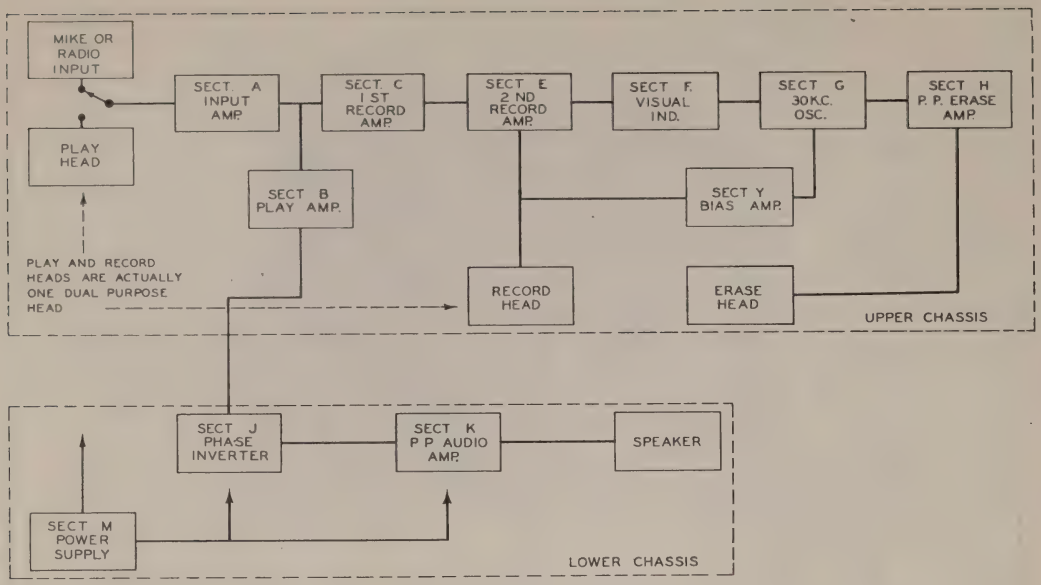
MIKE OR RADIO INPUT
PLAY HEAD
PLAY AND RECORD HEADS ARE ACTUALLY ONE DUAL PURPOSE HEAD
SECT. A INPUT AMP.
SECT. B PLAY AMP.
SECT. C 1 ST RECORD AMP.
SECT. E 2 ND RECORD AMP.
SECT. F. VISUAL IND.
SECT. G 30KC. OSC.
SECT. H P. P. ERASE AMP.
SECT Y BIAS AMP.
RECORD HEAD
ERASE HEAD
UPPER CHASSIS
SECT. J PHASE INVERTER
SECT. K P P AUDIO AMP.
SPEAKER
SECT. M POWER SUPPLY
LOWER CHASSIS

FIGURE 16—BLOCK DIAGRAM ELECTRICAL SYSTEM

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
	1	6SJ7	0V.	50VDC†	2VDC	0V.	2VDC	55VDC	50VDC†	85VDC	
	2	6SN7GT	0V.	180VDC	5.2VDC	0V.	170VDC	4.9VDC	50VDC†	50VDC†	
	3	6SJ7	0V.	50VDC†	2.8VDC	0V.	2.8VDC	115VDC	50VDC†	145VDC	
*	5	6SN7GT	30VDC	230VDC	72VDC	-10VDC	210VDC	0V.	50VDC†	50VDC†	
*	6	6SN7GT	-19VDC	335VDC	29VDC	-10VDC	335VDC	29VDC	50VDC†	50VDC†	
	7	6SN7GT	0V.	300VDC	2.7VDC	0V.	300VDC	2.7VDC	50VDC†	50VDC†	
	8	6SN7GT	0V.	350VDC	12.5VDC	0V.	350VDC	12.5VDC	50VDC†	50VDC†	
	9	5Y3GT	0V.	350VDC	0V.	300VAC	50VDC	300VAC	0V.	350VDC	
	10										

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
	1	6SJ7	0Ω	70KΩ	1800Ω	500KΩ	1800Ω	1.1 Meg.	70KΩ	300KΩ	
	2	6SN7GT	500KΩ	90KΩ	1000Ω	500KΩ	90KΩ	1000Ω	70KΩ	70KΩ	
	3	6SJ7	0Ω	70KΩ	290Ω	1.1 Meg.	290Ω	26KΩ	70KΩ	110KΩ	
*	5	6SN7GT	130KΩ	90KΩ	30KΩ	45KΩ	75KΩ	0Ω	70KΩ	70KΩ	
*	6	6SN7GT	150KΩ	60KΩ	700Ω	100KΩ	60KΩ	700Ω	70KΩ	70KΩ	
	7	6SN7GT	1.1 Meg.	90KΩ	700Ω	22KΩ	90KΩ	700Ω	70KΩ	70KΩ	
	8	6SN7GT	490KΩ	60KΩ	680Ω	450KΩ	60KΩ	680Ω	70KΩ	70KΩ	
	9	5Y3GT	0Ω	60KΩ	INF.	95Ω	70KΩ	90Ω	INF.	60KΩ	
	10										

*TAKEN IN RECORD POSITION. †6.3V AC BETWEEN FILAMENT PINS.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	105205	6SJ7 A. F. amplifier
2	103185	6SN7GT A. F. amplifier
3	105205	6SJ7 A. F. amplifier
4	105206	6E5 record lever indicator
5	103185	6SN7GT oscillator and bias amplifier
6	103185	6SN7GT erase amplifier
7	103185	6SN7GT A. F. phase inverter
8	103185	6SN7GT power output
9	102705	5Y3GT rectifier
10A,B	102711	Filter capacitor (electrolytic) 20-20 mfd. @ 450 volts
11A,B,C	103253	Filter capacitor (electrolytic) 20-20-20 mfd. @ 450/450/20 volts/450/25 volts
12	103382	Line filter—.02 mfd. @ 400 volts
13	103382	Line filter—.02 mfd. @ 400 volts
14	103256	Audio coupling—.01 mfd. @ 600 volts
15	103256	Audio coupling—.01 mfd. @ 600 volts
16	CM20AE501M	Erase head 30 k.c. tuning capacitor—.0005 mfd. @ 600 volts
17	103383	Erase coupling—.001 mfd. @ 600 volts
18	103383	Erase coupling—.001 mfd. @ 600 volts
19	103256	Oscillator grid capacitor—.01 mfd. @ 600 volts
20	103256	Oscillator feedback—.01 mfd. @ 600 volts
21	103383	Tuning capacitor—.001 mfd. @ 600 volts
22	CM20AE501M	30KC coupling—.005 mfd. @ 600 volts
23	CM20AE101M	30KC coupling—.0001 mfd. @ 600 volts
24	103252	Audio coupling—.1 mfd. @ 400 volts
25	103252	Audio coupling—.1 mfd. @ 400 volts
26	103382	Screen bypass—.02 mfd. @ 400 volts
27	103256	Audio coupling—.01 mfd. @ 600 volts
28	103380	Treble boost—.0025 mfd. @ 400 volts
29	103254	Treble boost—.05 mfd. @ 400 volts
30	103254	Treble boost—.05 mfd. @ 400 volts
31	CM20AE101M	Treble attenuator—.0001 mfd. @ 600 volts
32	103255	Bass boost—.002 mfd. @ 600 volts
33	103382	Audio coupling—.02 mfd. @ 400 volts
34	103254	Bass boost—.05 mfd. @ 400 volts
35	103382	Audio coupling—.02 mfd. @ 400 volts
36	103252	Screen bypass—.1 mfd. @ 400 volts
37	104750	A. F. cathode bypass—.500 mmf.
38A	103380	Play coil shunt—.0025 mfd. @ 400 volts
38B	103255	Play coil shunt—.002 mfd. @ 400 volts
38C	103636	Play coil shunt—.004 mfd. @ 400 volts
39	104750	Suppressor bypass 500 mmf.
40	103469	Play volume control—1 megohm
41	103469	Record volume control—1 megohm
42	103469	Tone control—1 megohm
43	RC20AE474K	Series external A. F.—470K ohms ½ watt
44	RC20AE223K	External A. F. load—22K ohms ½ watt
45	RC20AE474K	1st A. F. Grid—470K ohms ½ watt
46	RC20AE182K	1st A. F. cathode—1800 ohms ½ watt
47	RC20AE224K	1st A. F. plate load—220K ohms ½ watt
48	RC20AE105K	1st A. F. screen dropping—1 megohm ½ watt
49	RC20AE223K	Decoupling—22K ohms ½ watt
50	RC20AE102K	Play A. F. amp. cathode—1000 ohms ½ watt
51	RC20AE273K	Play A. F. amp. plate load—27K ohms ½ watt
52	RC20AE222K	Voltage dropping—2200 ohms ½ watt
53	RC20AE105K	Tone compensation—1 megohm ½ watt
54	RC20AE683K	Tone compensation—68K ohms ½ watt
55	RC20AE224K	Tone compensation—220K ohms ½ watt
56	RC20AE102K	Second A. F. cathode—1000 ohms ½ watt
57	RC20AE273K	Second A. F. plate load—27K ohms ½ watt
58	RC20AE333K	Tone compensation—33K ohms ½ watt
59	RC20AE822K	Tone compensation—8200 ohms ½ watt
60	RC20AE105K	A. F. grid—1 megohm ½ watt
61	RC20AE271K	A. F. cathode—270 ohms ½ watt
62	RC30AE473K	A. F. plate load—47K ohms 1 watt
63	RC20AE273K	Bleeder—27K ohms ½ watt
64	RC20AE333K	A. F. screen dropping—33K ohms ½ watt
65	RC20AE105K	Record tuning eye grid—1 megohm ½ watt
66	RC20AE105K	Record tuning eye plate load—1 megohm ½ watt
67	RC20AE104K	Oscillator grid—100K ohms ½ watt
68	RC20AE273K	Oscillator plate load—27K ohms ½ watt
69	RC20AE273K	Phasing resistor—27K ohms ½ watt
70	RC20AE104K	Erase amplifier grid—100K ohms ½ watt
71	RC20AE104K	Erase amplifier grid—100K ohms ½ watt
72	RC20AE473K	Bias amplifier grid 100K ohms ½ watt
73	RC30AE153K	Bias amplifier plate load—15K ohms 1 watt
74	RC30AE182K	Erase amp. cathode—1800 ohms 1 watt
75	105969	Panel, output
76	1-105973-1	Speaker on-off switch
77	RC20AE681K	A. F. cathode—680 ohms ½ watt
78	RC30AE273K	A. F. plate load—27K ohms 1 watt
79	RC30AE273K	Phase inverter plate load—27K ohms 1 watt
80	RC30AE333K	Phase inverter grid—22K
81	RC20AE474K	Output grid—470K ohms ½ watt
82	RC20AE474K	Output grid—470K ohms ½ watt
83	RC20AE681K	Output cathode—680 ohms ½ watt
84	103808-3	Voltage dropping—100 ohms 10 watts
85	200925	Filter choke
86	200924	Power transformer
87	105908	Output transformer
88	305723	Speaker (3.2 ohms, oval)
89	None	Cone not supplied separately
90	103293	Oscillator coil
91	103820	Selenium rectifier
92	102625	Fuse, No. 3 AG—2 amp.
93	1-105973-1	Toggle switch
93A	103258	Switch nut (hex) accessory
93B	103258	Switch nut (knurled) accessory (part of 93)
94	201364-4	Record-play switch
95	106083	Reverse limit switch (Micro)
	103144	Reverse limit switch (Acro)
96	106083	Forward limit switch (Micro)
	103144	Forward limit switch (Acro)

PARTS LIST—*continued*

Ref. No.	Part No.	DESCRIPTION
97	200847	Pushbutton switch assembly
97A		Forward pushbutton
97B		Reverse pushbutton
97C		Start pushbutton
97D		Stop pushbutton
97E		Record pushbutton
98	300496	Record-reproduce and erase head assembly
98A	201195	Erase head—black finish
98B	300381	Record-play head—black finish
99	104820	Reel hold-down screw (used with 204927 motor)
100	104821	Reel hold-down clamp (used with 204927 motor)
101	BK-921	Reel empty (supply)
102	104154-1	Reverse limit switch cover
103	104202	Reel hold-down screw
104	103011-1	Reel hold-down cap
105	BK-921	Reel empty (take up)
106	103156	Actuator, reverse limit switch
107	104086-1	Reverse limit switch guide
108		Capstan cover screw
109	ILW-10	Lock washer
110	103011	Capstan cover
111		8-32 x 5/16 R.H. Phillips motor mounting screw
112	ILW-10	Lock washer
113	103149-1	Forward limit switch cover
114	103156	Actuator, forward limit switch
115	206078-501	Motor, Russel, take up
116		8-32 x 5/16 R.H. Phillips motor mounting screw
117	ILW-8	Lock washer
118		8-32 x 3/8, R. H. Phillips screw (pre-amp. to panel)
119	305868	Panel, black finish
120		10-32 x 5/16, R. H. Phillips screw (drive assembly to panel)
121	103010	Spindle (capstan)
122		Screw (head assembly to panel)
123		10-32 x 5/16, R. H. Phillips screw (drive assembly to panel)
124		6-32 x 1/4, R. H. Phillips screw (forward limit switch mounting)
125		8-32 x 3/8, "Z" R. H. machine screw (limit switch cover)
126	103564-501	Brake shoe (supply)
127	103568	Head shoe mounting rod
127A	W-6	End play washer
127B		Tinnerman nut
128	104822	Turntable (204297 motor only)
129	W-8	Thick spacing washer (used only with 204297 motor)
129A	103047	Thin spacing washer
130	204927	Rewind motor
131	ELW-6	Lock washer
132		Nut 6-32 large hex
133	103567-501	Erase head brake shoe assembly (with pad)
134	103567-501	Record-reproduce head brake shoe assembly (with pad)
135	103880	Head brake shoe spring
136	104525	S-hook, head brake
137	103013	Turntable for 206078-501 motor
138	A-21421	Jack input
139	ILW-8	Lock washer
140	103584	Stud-amplifier suspension
141	200470	Bell crank assembly
142	ELW-6	Lock washer (bell crank mounting)
143		4-40 x 5/16, R. H. machine screw (bell crank mounting)
144	105762	Flywheel, capstan drive
144A	105761	Capstan, low speed
144B	105760	Capstan, hi speed
145	103142	Clip, idler wheel
146	103067	Washer, idler adj. nut
147	103048	Idler wheel
148	ILW-10	Lock washer drive assembly mounting
149		8-32 x 1/2, R. H. Phillips screw, drive motor mounting
150	103582	Stud, drive assembly mounting
151	ILW-8	Lock washer
152	W-8	Washer
152A	W-8	Washer
153	200846	Drive assembly plate
154		8-32 x 1/2, R. H. Phillips screw, motor mounting
155	103250	Idler wheel bracket
155A	103148	Idler thrust washer
156	103153	Felt cushion
157	103032	Idler wheel tension spring
157A	L-71	Idler wheel tension spring lug
158		6-32 elastic stop nut, idler bracket adj. nut
159	ILW-10	Lock washer, plate mounting
160		8-32 x 5/16 R. H. Phillips screw, plate mounting
161		Drive spring (not used on some motors, not supplied separately)
162	103226	Spacer, motor mounting
163	103428	Motor mounting grommet
164	200988-1	Brake shoe cover, black finish
165		Lack washer, capstan spindle, 1/4-in. Cantlink
166		Nut, hex, 1/4 x 20
167	201404	Drive motor
168	104784	Hum shield, drive motor (used only with certain type motors)
169	405978	Carrying case
170	205779	Speaker grill
171	201154	Microphone, Brush BA-106
172	103468-1	Control knob, black finish
173	103556-1	Pushbutton knob, black finish
174	105907	Input matching transformer
175	105979	Lo impedance input jack
176	1-105973-1	Hi-lo gain switch
177	106005	Output transformer load 5 ohm 1 watt
178	RC20AE391K	Output network 390 ohm 1/2 watt
179	RC20AE151K	Output network 150 ohm 1/2 watt
180	RC20AE221K	Output network 220 ohm 1/2 watt
181	206004	600 ohm output terminal strip
182	105708	Pilot light jewel
	105710-1	Pilot light bulb
	105707	Pilot light bracket
183	105980	Plug, pin insert, cannon type
184	105968	Panel, input

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*TRADE MARK

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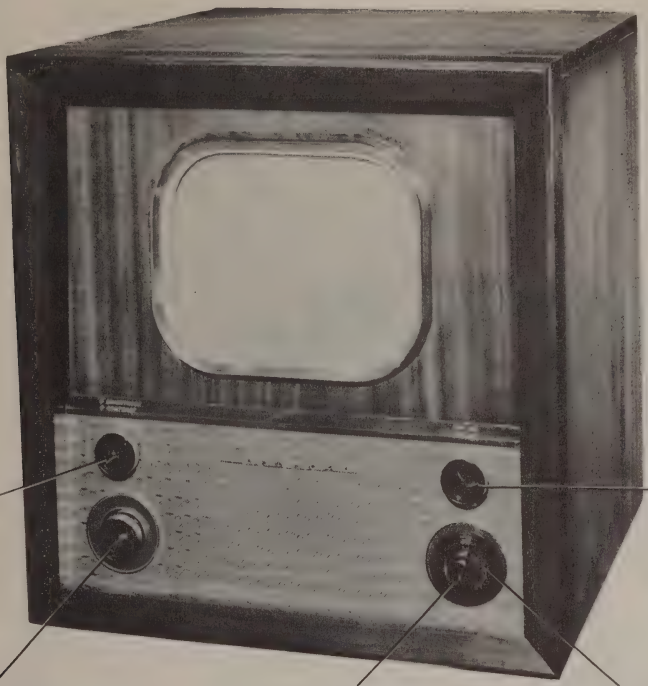

CORONADO MODELS 94TV2-43-8970A, 8971A, 8972A, 8973A, 8985A, 8986A, 8987A, 8993A, 8994A, 8995A

TRADE NAME	Coronado Models 94TV2-43-8970A, 94TV2-43-8971A, 94TV2-43-8972A, 94TV2-43-8973A, 94TV2-43-8985A, 94TV2-43-8986A, 94TV2-43-8987A, 94TV2-43-8993A, 94TV2-43-8994A, 94TV2-43-8995A
SUPPLIER	Gamble-Skogmo Inc., 15 N. 8th St., Minneapolis, Minn.
TYPE SET	TV Receiver
TUBES	Twenty One
POWER SUPPLY	105-125 Volts AC-60 Cycle
RATING:	1.8 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13

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Cabinet-Rear View	19	Voltage and Resistance Measurements	8
Capacitor Identification	11,18		

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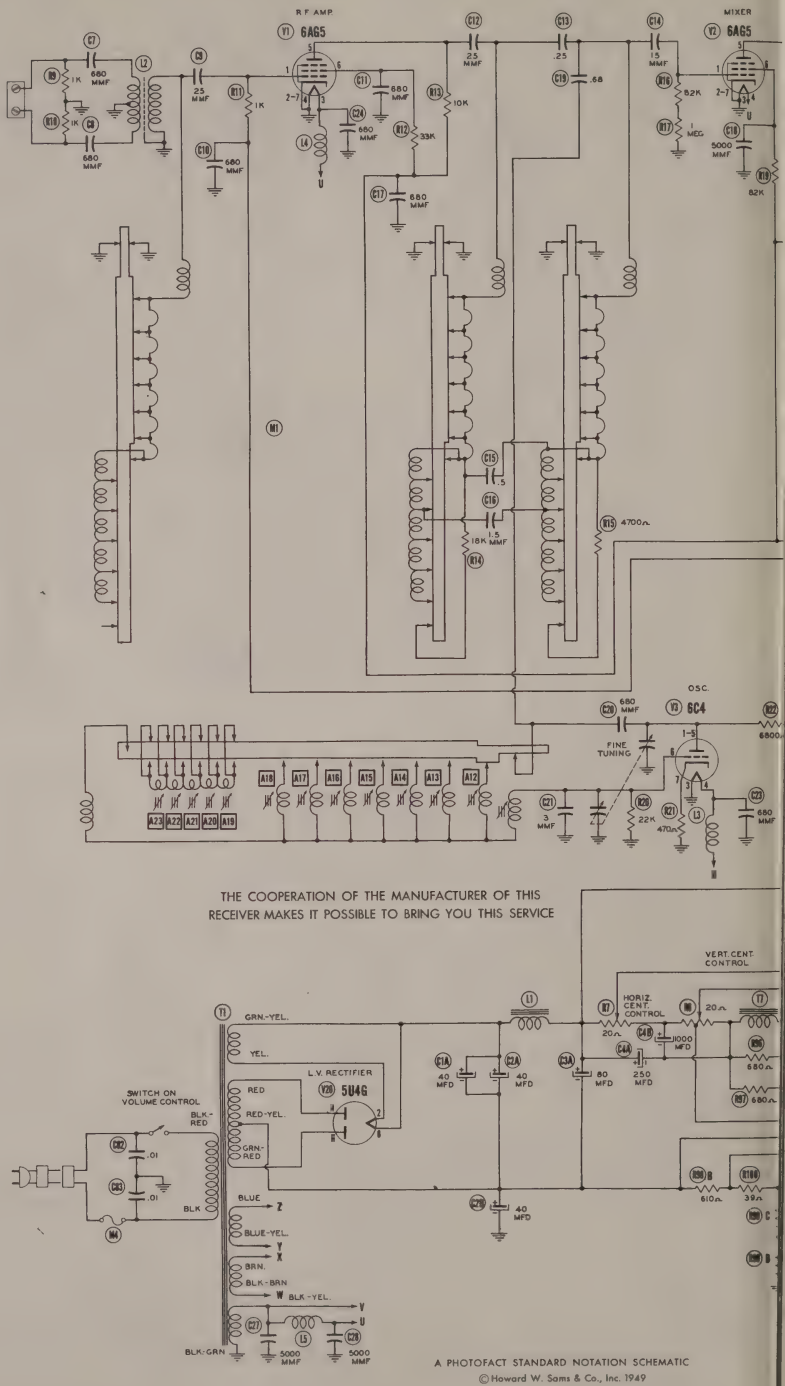
R.F. AMP.
Y1 6AG5
MIXER
Y2 6AG5
OSC.
Y3 6C4
FINE TUNING
L.V. RECTIFIER
Y20 5U4G
SWITCH ON VOLUME CONTROL
VERT. CENT. CONTROL
HORIZ. CENT. CONTROL
GRN.-YEL.
YEL.
RED
RED-YEL.
GRN.-RED
BLK.-RED
BLUE
BLK
BLUE-YEL.
BRN.
BLK.-BRN
BLK.-YEL.
BLK.-GRN
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CHASSIS TOP VIEW

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L15
L19
M3
L1
B2
T2
T8
SP1
SP2

CORONADO MODELS 94TV2-43-8970A, 8971A, 8972A, 8973A, 8985A, 8986A, 8987A, 8993A, 8994A, 8995A

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If receiver is to be aligned with picture tube removed, it is recommended to remove the horizontal oscillator tube 6SN7GT (V16) to eliminate the high voltage shock hazard.

When complete alignment is required, it should be done in the order outlined below.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.05MFD	High side to pin 1 (Grid) of 6AU6 (V10). Low side to chassis.	21.25MC (Unmod.)	13	DC Probe thru 1 Meg to Point (A). Common to chassis.	A1,A2	Detune A1. Adjust A2 for maximum deflection.
2.	.05MFD	"	"	"	DC Probe thru 1 Meg to Point (B) Common to chassis.	A1	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
3.	.05MFD	High side to pin 1 (Grid) of 6BA6 (V9). Low side to chassis.	"	"	DC Probe thru 1 Meg to Point (C) Common to chassis.	A3,A4	Adjust for maximum deflection.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.05MFD	High side to pin 1 (Grid) of 6BA6 (V9). Low side to chassis.	21.25MC (1MC Sweep)	21.25MC	13	Vert. Amp. to Point (C) Low side to chassis.	A3,A4	If 60\ sweep is used shunt R50 with 5600Ω. Adjust A3 and A4 for maximum amplitude and symmetry as per Fig 1.
2.	.05MFD	"	"	"	"	Vert. Amp. to Point (B) Low side to chassis.	A1,A2	Adjust A1 so 21.25MC marker occurs at center of diagonal line as per Fig. 2. Adjust A2 for maximum amplitude and straightness of diagonal lines. Continue with step 4.

VIDEO IF ALIGNMENT

Before starting video IF alignment, connect VTVM between junction of R28 and R29 and chassis. Adjust contrast control for -3 volts. Leave contrast control at this setting for entire video IF alignment. If receiver is to be used in a fringe area, set contrast control for -1 volt.

Remove local oscillator tube 6C4 (V3) to prevent erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	21.25MC (Unmod.)	13	DC Probe to Point (D) Common to chassis.	A5,A6	Adjust for MINIMUM deflection.
5.		"	27.25MC	"	"	A7	"
6.		"	22.8MC	"	"	A8	Adjust for maximum deflection.
7.		"	23.9MC	"	"	A9	"
8.		"	26.0MC	"	"	A10	"
9.		"	24.5MC	"	"	A11	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.		High side to ungrounded tube shield floating over mixer tube (V2).	24MC (10MC Sweep)	21.25MC 23.0MC 25.0MC 25.75MC 27.25MC	13	Vert. Amp. to Point (B) Low side to chassis.		Check response curve obtained on scope. If necessary, retouch A5 thru A11 for proper response curve and placement of markers as per Fig 3.

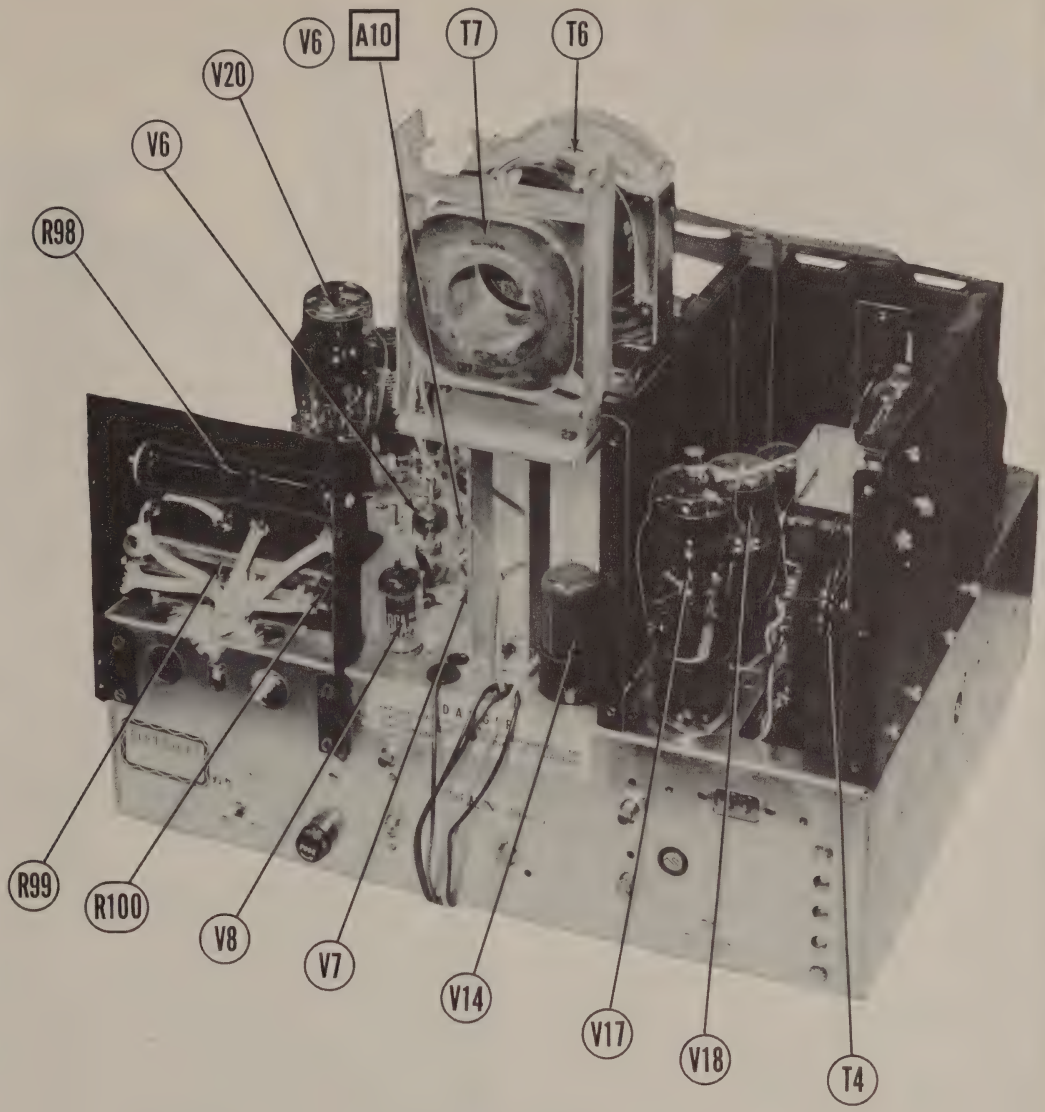
OSCILLATOR ALIGNMENT

The RF and mixer lines in this receiver are pre-set at the factory and normally do not require adjustment in the field.

Prior to aligning the oscillator circuits, the sound IF system must be accurately aligned. Set the fine tuning control to the mid point of its range.

The oscillator slugs (A12-A23) are accessible through holes in the front of the tuner which are identified by the channel numbers.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	Two 125Ω carbon res.	Across antenna terminals with 125Ω in each lead.	215.75MC (Unmod.)	13	DC Probe thru 1 Meg. to Point (E) Common to chassis.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
12.	"	"	209.75MC	12	"	A13	"
			203.75MC	11		A14	
			197.75MC	10		A15	
			191.75MC	9		A16	
			185.75MC	8		A17	
			179.75MC	7		A18	
			87.75MC	6		A19	
			81.75MC	5		A20	
			71.75MC	4		A21	
			65.75MC	3		A22	
			59.75MC	2		A23	



CHASSIS TOP VIEW

FIG. 1

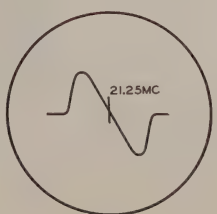


FIG. 2

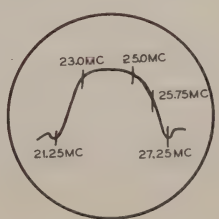


FIG. 3

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-.8VDC	0V	6.3VAC	0V	145VDC	160VDC	0V		
V 2	6AG5	-2.2VDC	0V	0V	6.3VAC	250VDC	135VDC	0V		
V 3	6C4	205VDC	0V	0V	6.3VAC	205VDC	§-.7VDC	4.8VDC		
V 4	6AG5	-.8VDC	.4VDC	6.3VAC	0V	120VDC	120VDC	.4VDC		
V 5	6AG5	-.8VDC	.4VDC	6.3VAC	0V	115VDC	115VDC	.4VDC		
V 6	6AG5	0V	1.2VDC	6.3VAC	0V	75VDC	120VDC	1.2VDC		
V 7	6AL5	0V	-.7VDC	0V	6.3VAC	0V	0V	0V		
V 8	12AU7	115VDC	-.7VDC	0V	6.3VAC	6.3VAC	♦145VDC	♦0V	♦.7VDC	0V
V 9	6BA6	0V	0V	0V	6.3VAC	110VDC	110VDC	1.1VDC		
V 10	6AU6	-.6VDC	0V	0V	6.3VAC	122VDC	82VDC	0V		
V 11	6AL5	0V	-.1VDC	6.3VAC	1.4VAC	0V	0V	-.1VDC		
V 12	6AT6	-.6VDC	0V	0V	6.3VAC	0V	-.1VDC	70VDC		
V 13	6K6GT	0V	6.3VAC	192VDC	200VDC	-5.7VDC	-16VDC	0V	0V	
V 14	6SN7GT	-.7VDC	140VDC	0V	-.8VDC	217VDC	7.3VDC	6.3VAC	0V	
V 15	6SN7GT	♦-7.6VDC	♦80VDC ♦135VDC	♦0V	♦-.1VDC	♦295VDC	♦4.5VDC ♦19VDC	6.3VAC	0V	
V 16	6SN7GT	♦-2.2VDC	♦95VDC	♦-3.1VDC	♦-55VDC	♦150VDC	♦0V	6.3VAC	0V	
V 17	6BG6G	0V	6.3VAC	♦9.1VDC	♦0V	♦0V	0V	0V	♦255VDC	TOP CAP *
V 18	5V4G	0V	320VDC	320VDC	260VDC	0V	260VDC	0V	320VDC	
V 19	1B3GT	* DO NOT MEASURE								
V 20	5U4G	0V	270VDC	0V	320VAC	0V	320VAC	0V	270VDC	
V 21	10BP4	♯150VDC	PIN 10 310VDC	PIN 11 220VDC	PIN 12 ♯150VDC					

§ Taken with vacuum tube voltmeter.
♦ Measured from pin 6 of V16
♯ 6.3VAC measured across filament.
Note. Contrast control set at maximum for these measurements.

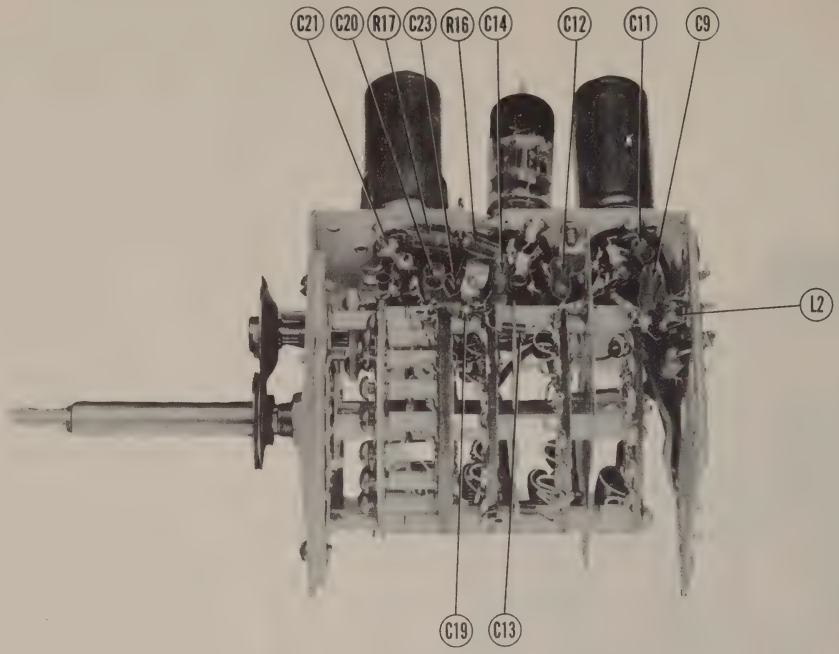
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	8KΩ	0Ω	.1Ω	0Ω	†10KΩ	†33KΩ	0Ω		
V 2	6AG5	1 Meg.	0Ω	0Ω	.1Ω	†1.5KΩ	†82KΩ	0Ω		
V 3	6C4	†6.8KΩ	Inf.	0Ω	.1Ω	†6.8KΩ	22KΩ	470Ω		
V 4	6AG5	22KΩ	39Ω	.1Ω	0Ω	†2.5KΩ	†2.5KΩ	39Ω		
V 5	6AG5	16KΩ	39Ω	.1Ω	0Ω	†2.5KΩ	†2.5KΩ	39Ω		
V 6	6AG5	5.6KΩ	150Ω	.1Ω	0Ω	†9.5KΩ	†2.5KΩ	150Ω		
V 7	6AL5	.1Ω	4 Meg.	0Ω	.1Ω	0Ω	0Ω	2KΩ		
V 8	12AU7	†5KΩ	1 Meg.	0Ω	.1Ω	.1Ω	†6KΩ	1 Meg.	♦47Ω	0Ω
V 9	6BA6	0Ω	0Ω	0Ω	.1Ω	†2.7KΩ	†2.7KΩ	82Ω		
V 10	6AU6	470KΩ	0Ω	0Ω	.1Ω	†2.5KΩ	†23KΩ	0Ω		
V 11	6AL5	200KΩ	100KΩ	.1Ω	2Ω	0Ω	0Ω	100KΩ		
V 12	6AT6	10 Meg.	0Ω	0Ω	.1Ω	Inf.	85KΩ	†330KΩ		
V 13	6K6GT	Inf.	.1Ω	†2KΩ	†1.5KΩ	470KΩ	150Ω	0Ω	0Ω	
V 14	6SN7GT	1 Meg.	†15KΩ	0Ω	4 Meg.	†380Ω	6.8KΩ	.1Ω	0Ω	
V 15	6SN7GT	2 Meg.	♦2.7Meg. ♦1.4Meg.	♦0Ω	2.2 Meg.	†2KΩ	♦5.5KΩ ♦560Ω	.1Ω	0Ω	
V 16	6SN7GT	700KΩ	♦120KΩ	280KΩ	200KΩ	♦130KΩ	800Ω	.1Ω	0Ω	
V 17	6BG6G	Inf.	.1Ω	♦82Ω	1 Meg.	1 Meg.	Inf.	0Ω	†5KΩ	TOP CAP ♦200Ω
V 18	5V4G	Inf.	120KΩ	120KΩ	†58Ω	Inf.	†58Ω	Inf.	120KΩ	
V 19	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ♦ 360Ω
V 20	5U4G	Inf.	9.5KΩ	Inf.	♦20Ω	Inf.	♦18.5Ω	Inf.	9.5KΩ	
V 21	10BP4	†1.5KΩ	†6KΩ	PIN 10 ♦56KΩ	PIN 11 †400Ω	PIN 12 †1.5KΩ				

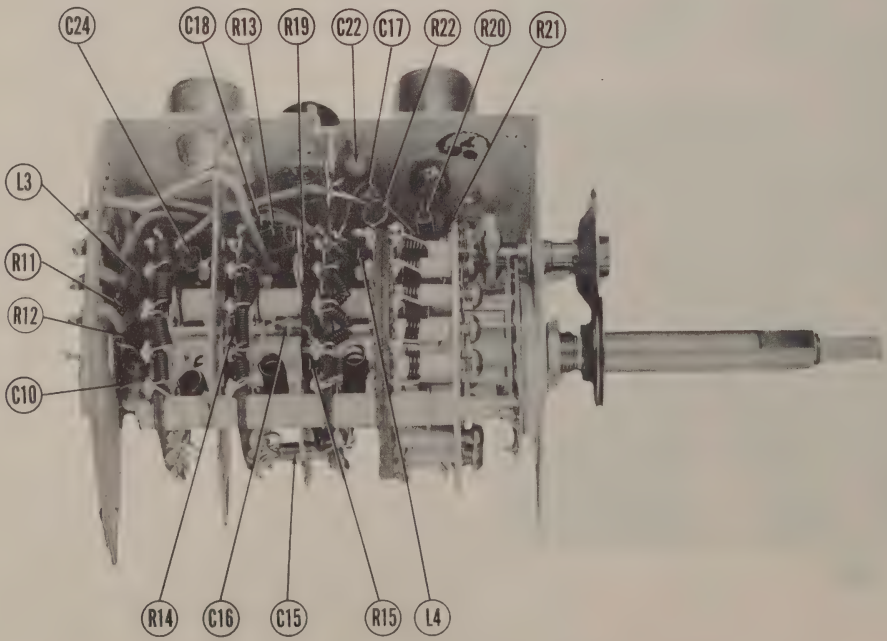
† Measured from pin 8 of V20
♣ Measured from pin 8 of V18
♦ Measured from pin 6 of V16

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

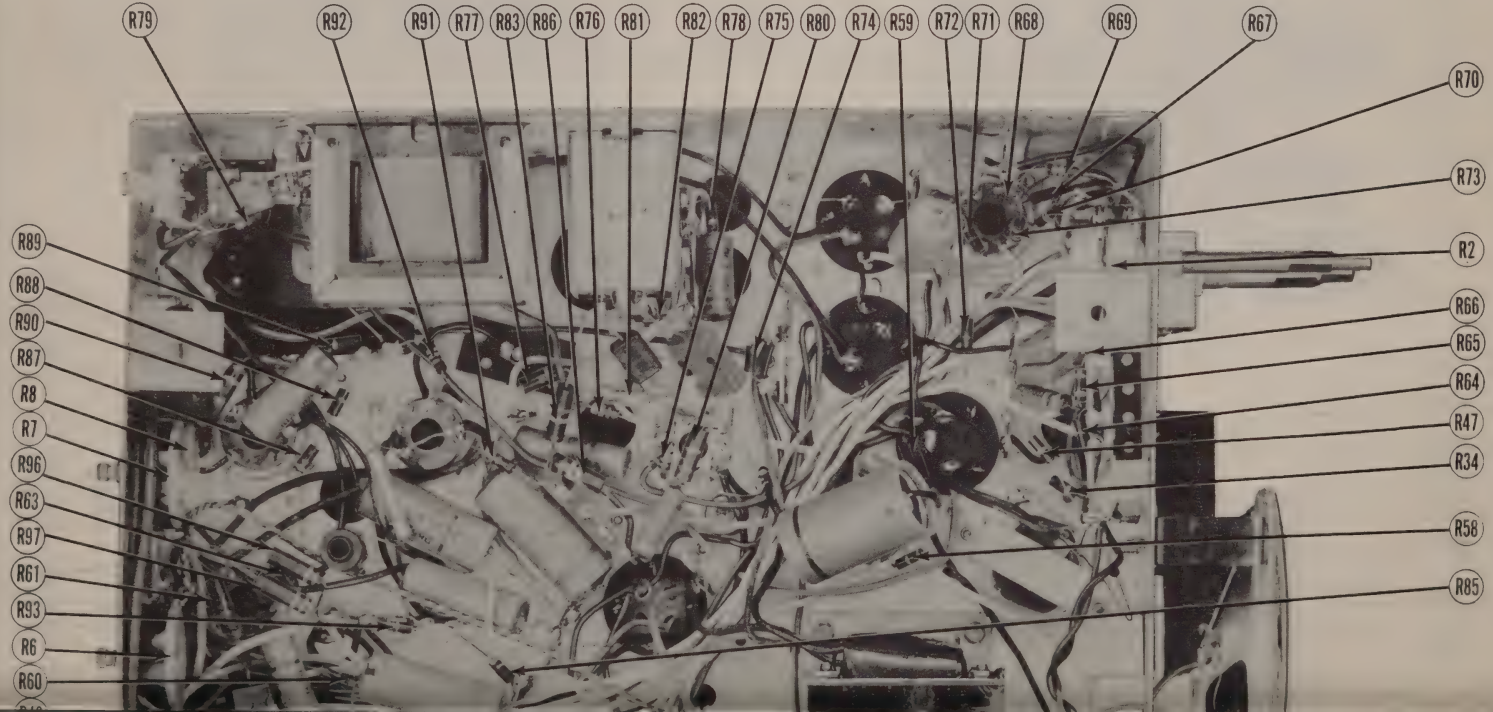


RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION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R68
R69
R67
R70
R73
R2
R66
R65
R64
R47
R34
R58
R85
R89
R88
R90
R87
R8
R7
R96
R63
R97
R61
R93
R6
R60

CORONADO MODELS 94TV2-43-8970A, 8971A, 8972A, 8973A, 8985A, 8986A, 8987A, 8993A, 8994A, 8995A

BLOCK DIAGRAM

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Mixer	6AG5	6AG5	7BD	
V3A	Oscillator	6C4	6C4	6BG	Used in models 94TV2-43-8970A, 8971A, 8985A, 8986A
B	Oscillator	6AB4	6AB4	6BG	Used in models 94TV2-43-8972A, 8973A, 8993A, 8994A, 8995A
V4	1st Video IF	6AG5	6AG5	7BD	
V5	2nd Video IF	6AG5	6AG5	7BD	
V6	3rd Video IF	6AG5	6AG5	7BD	
V7	Video Detector-Sync. Clamper	6AL5	6AL5	6BT	
V8	1st & 2nd Video Amp	12AU7	12AU7	9A	
V9	Sound IF Amp.	6BA6	6BA6	7BK	
V10	Limiter	6AU6	6AU6	7BK	
V11	Disc.	6AL5	6AL5	6BT	
V12	AF Amp.-Bias Clamper	6AT6	6AT6	7BT	
V13	Audio Output	6K6GT	6K6GT	7S	
V14	Sync. Amp.-Sync. Sep.	6SN7GT	6SN7GT	8BD	
V15	Vert. Osc.-Vert. Disch.-Vert. Amp.	6SN7GT	6SN7GT	8BD	
V16	Hor. AFC-Hor. Osc.	6SN7GT	6SN7GT	8BD	
V17	Hor. Output	6BG6G	6BG6G	5BT	
V18	Damper	5V4G	5V4G	5L	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	
V21A	Picture Tube	10BP4	10BP4	12D	
B	Picture Tube	12LP4	12LP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	45X367	AFH6J2H	UP7BJ920		TVL-69	◓ Filter
B	10	350						▲ Vert. Output Dec.
C2A	40	450	45X370	AFH8J8D26B	UP9CJ887		TVL-57	◓ Filter
B	40	150						■ Filter
C	130	50						▲ Vert. Output Cath. Bypass
C3A	80	450	45X369	AFH162J	UP9BJ857		TVL-47	◓ Filter
B	10	450						▲ Vert. Osc. Decoupling
C4A	250	10	45X368	AFH50R200S	UP7BJ808		TVL-66	◓ Hor. Cent. Cont. Bypass
B	1000	6						▲ Vert. Cent. Cont. Bypass
C5A	10	450	45X371	AFH2J6I6G	UP8CJ898		TVL-56	◓ Decoupling
B	30	400						■ Filter
C	30	300						▲ Filter
C6	24	300	45X372	PRS350/24	BR2035		UT-203	Output Decoupling
C7	680		47X554			GP2K-680		Ant. Coupling
C8	680		47X554			GP2K-680		Ant. Coupling
C9	25		47X487			GP1K-25		RF Coupling
C10	680		47X554			GP2K-680		Bias Filter
C11	680		47X554			GP2K-680		RF Screen Bypass
C12	25		47X487			GP1K-25		RF Coupling
C13	.25							RF Coupling
C14	15		47X552			GP1K-15		RF Coupling
C15	.5							RF Coupling
C16	1.5							RF Coupling
C17	680		47X554			GP2K-680		RF Bypass
C18	5000		47X507			811-005	29C1	Conv. Screen Bypass
C19	.68							Osc. Coupling
C20	680		47X554			GP2K-680		Osc. Feedback
C21	3							Osc. Feedback
C22	680		47X554			GP2K-680		RF Bypass
C23	680		47X554			GP2K-680		Osc. Fil. Bypass
C24	680		47X554			GP2K-680		Conv. Fil. Bypass
C25	1500		47X545			GP2L-0015		Decoupling
C26	47					NP0M-50		Fixed Trimmer *
C27	5000		47X507	1467-005	1D5D5	811-005	29C1	Filament Bypass
C28	5000		47X507	1467-005	1D5D5	811-005	29C1	Filament Bypass
C29	270	1000	47X534	1468-00025	5W5T25	GP2K-270	1FM-325	IF Coupling
C30	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	Bias Filter
C31	.25	400	D65254	P488-25	GT4P25		TC-2	Bias Filter
C32	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	1st V. IF Decoupling
C33	270	1000	47X534	1468-00025	5W5T25	GP2K-270	1FM-325	IF Coupling
C34	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	Bias Filter
C35	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd V. IF Decoupling
C36	51			1469-00005	5R5Q5	NP0M-50	MS-45	Fixed Trimmer †
C37	270	1000	47X534	1468-00025	5W5T25	GP2K-270	1FM-215	IF Coupling
C38	75			1469-000075		NP0M-75		Fixed Trimmer
C39	100		47X546	1468-0001	5W5T1	GP1K-100	1FM-31	3rd V. IF Cath. Bypass
C40	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd V. IF Decoupling
C41	270	1000	47X534	1468-00025	5W5T25	GP2K-270	1FM-325	IF Coupling
C42	10	500	47X542	1468-00001	5W5Q1	GP1K-10	MS-41	V. Diode Filter
C43	.05	400	D67503	P488-05	GT4S5		TM-15	Video Coupling
C44	.05	400	D67503	P488-05	GT4S5		TM-15	Video Coupling
C45	.25	400	D65254	P488-25	GT4P25		TC-2	Pic. Tube Cath. Dec.
C46	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	1st S. IF Cath. Bypass
C47	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	1st S. IF Dec.
C48	.01	400	D67103	P488-01	GT4S1	GP2-335-01	TM-11	Limiter Grid Filter
C49	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	Limiter Screen Bypass
C50	1500		47X545	1467-0015	1W5D15	GP2L-0015	1FM-215	Limiter Plate Dec.
C51	270	1000	47X534	1468-00025	5W5T25	GP2K-270	1FM-325	RF Bypass
C52	.0025	400	D54252	P688-0022	GT6D3	GP2M-0025	TM-23	Audio Coupling
C53	.01	400	D67103	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling

CAPACITOR

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.
C54	.0025	400	D54252	P688-0022	GT6D3
C55	.01	400	D67103	P488-01	GT4S1
C56	.005	600	F65502	P693-005	GT6D5
C57	.05	400	D67503	P488-05	GT4S5
C58	100	500	47X544	1466-0001	5W5T1
C59	390	1000	47X535	1468-0004	5W5T4
C60	.002	600	F66202	P688-002	GT6D2
C61	4700	500	D65502	1467-005	1D5D5
C62	4700	500	D65502	1467-005	1D5D5
C63	4700	500	47X543	1467-005	1D5D5
C64	.1	1000	46X409	1084-1	
C65	.25	400	D65254	P488-25	GT4P25
C66	120	500	47X532		
C67	120	500	47X532		
C68	.002	600	F66202	P688-002	GT6D2
C69	.25	400	D65254	P488-25	GT4P25
C70	.02	400	D65202	P488-02	GT4S2
C71	.05	400	D67503	P488-05	GT4S5
C72	180	1000	47X536		
C73	2200	1000	47X531		
C74	390	1000	47X535	1468-0004	5W5T4
C75	47	500	47X541	1468-00005	5W5Q5
C76	.25	400	D65254	P488-25	GT4P25
C77	.05	600	F67503	P688-05	GT6S5
C78	.035	1000	46X408		
C79	.1	1000	46X409	1084-1	
C80	5	1500	47X533		
C81	500	10000	47X530		
C82	.01	400	46X410	P488-01	GT4S1
C83	.01	400	46X410	P488-01	GT4S1

* Some models use 62MMF in this application.
† Some models use 56MMF in this application.

CONT

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROST PART N
R1A	10KΩ	½	78X1	B11-116 *	
B	500KΩ	½		B11-133 *	
C	Shaft End			E187 *	
R2A	1 Meg.	½	78X2	B11-137 *	
B	50KΩ	½		B11-123 *	
C	Shaft End			E187 *	
R3A	1 Meg.	½	36X378	Q13-137	M-63-Z
B	Switch		Not Req.	76-1	SW-A
R4	5000Ω	½	77X4	Q11-114	M-19-S
R5	2.5Meg.	½	77X3	Q11-239	M-84-S
R6	20Ω	2	77X2	W-20X10	58-20 CT
R7	20Ω	2	77X5	W-20	43-20
R8	2250Ω	4	77X1		10-2500

* Additional parts to be used with "Concentr

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ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: IRC PART No.
R9	1000Ω 20%	½	B65102	BTS-1000
R10	1000Ω 20%	½	B65102	BTS-1000
R11	1000Ω 20%	½	B65102	
R12	33KΩ 20%	½	B85333	
R13	10KΩ 20%	1	C85103	
R14	18KΩ	½	C85183	BTS-18K
R15	4700Ω 20%	½	C85472	
R16	82KΩ 20%	½	C85823	
R17	1 Meg. 20%	½	C85105	
R18	1000Ω 20%	½	C85102	BTS-1000
R19	82KΩ 20%	½	C85823	
R20	22KΩ 20%	½	C85223	
R21	470Ω 20%	½	C85471	
R22	68000Ω 20%	1	C85682	
R23	15KΩ 5%	½	32B3153	
R24	39Ω	½	32B4390	
R25	1000Ω 20%	½	32B5102	
R26	6.8 Meg.	½	32B4685	BTS-6.8 Meg.
R27	82KΩ	½	32B4823	BTS-82K
R28	10KΩ	½	32B4103	BTS-10K
R29	12KΩ	½	32B4123	BTS-12K
R30	1000Ω 20%	½	32B5102	BTS-1000
R31	5600Ω 5%	½	32B3562	
R32	39Ω	½	32B4390	
R33	1000Ω 20%	½	32B5102	
R34	1000Ω	½	32B4102	BTS-1000
R35	5600Ω 5%	½	32B3562	
R36	150Ω	½	32B4151	
R37	68000Ω 20%	½	32B3682	
R38	1000Ω 20%	½	32B5102	BTS-1000
R39	4700Ω 5%	½	32B4472	BTS-4700-5%
R40	3300Ω 5%	½	32B4332	BTS-3300-5%
R41	1 Meg. 20%	½	32B5105	BTS-1 Meg.
R42	330Ω	½	32B4332	BTS-3300
R43	47Ω 20%	½	32B5470	EW-½-47
R44	1 Meg. 20%	½	32B5105	BTS-1 Meg.
R45	330Ω	1	32C4332	BTA-3300

ESCRIPTIONS

(ONT.)

ERIE ART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
Y-0025	TM-23	De-emphasis
-335-01	TM-11	Audio Coupling
	TM-25	Output Plate Bypass
	TM-15	Sync. Coupling
K-100	1FM-31	Sync. Coupling
	1FM-34	Sync. Amp. Cath. Bypass
M-002	TM-22	Integrator Net.
M-0047	1FM-25	Integrator Net.
M-0047	1FM-25	Integrator Net.
M-0047	1FM-25	Vert. Osc. Grid Cap.
	PX-11	Vert. Discharge
	TC-2	Vert. Sweep Coupling
K-120		Hor. Sync. Coupling
K-120		Voltage Divider
M-002	TM-22	Hor. Sync. Coupling
	TC-2	AFC Filter
	TM-12	AFC Filter
	TM-15	AFC Plate Bypass Hor. Osc. Grid Cap.
		Hor. Discharge
	1FM-34	Hor. Sweep Coupling
K-47	1FM-45	Voltage Divider
	TC-2	Hor. Output Cath. Bypass
	TM-15	Hor. Output Screen Bypass
		Damper Filter
	PX-11	Damper Filter AFC Feedback
-500		HV Filter
	TM-11	Line Filter
	TM-11	Line Filter

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INSTALLATION NOTES
Contrast Control, Front (Dual Concentric) Brightness control, rear
Attach per instructions in "Concentrikit". Vert. hold control, front (Dual Concentric) Horiz. hold control, rear
Attach per instructions in "Concentrikit". Volume control Attach to R3A per instructions Vert. linearity control Height control Vert. centering, control tapped @ 10Ω Wire Wound
Horiz. centering control, Wire Wound Focus control, Wire Wound

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IDENTIFICATION CODES
ESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
Isolation
Isolation
rid
reen
ate
ate Coil Shunt
Grid Coil Shunt
Grid
Grid
Plate Decoupling
Screen
Grid
Cathode
Plate
ideo IF Grid
ideo IF Cathode
ideo IF Decoupling
ge Divider See Note 2
Network See Note 2
Network
Network
Network
ideo IF Grid
ideo IF Cathode
ideo IF Decoupling
ge Divider
ideo IF Grid
ideo IF Cathode
ideo IF Plate
ideo IF Decoupling
Det. Diode Load
Det. Diode Load
ideo Amp. Grid
ideo Amp. Plate
ideo Amp. Cathode
ideo Amp. Grid
ideo Amp. Plate

RESISTORS (CONT.)

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CORONADO PART No.	IRC PART No.	
R46	100Ω	½	32B4102	BTS-1000	2nd Video Amp. Plate
R47	100KΩ 20%	½	32B5104	BTS-100K	Voltage Divider
R48	82Ω	½	32B4820		1st Sound IF Cathode
R49	1200Ω	½	32B4122		1st Sound IF Decoupling
R50	470KΩ 20%	½	32B5474		2nd Sound IF Grid
R51	22KΩ 20%	½	32B5223		2nd Sound IF Screen
R52	1000Ω 20%	½	32B5102		2nd Sound IF Plate Decoupling
R53	100KΩ 5%	½	32B3104	BTS-100K-5%	Disc. Diode Load
R54	100KΩ 5%	½	32B3104	BTS-100K-5%	Disc. Diode Load
R55	5.1Ω	½	43X239	BW-½-4.7	Disc. Filament (Wire Wound)
R56	10 Meg.20%	½	32B5106	BTS-10 Meg.	AF Grid
R57	330KΩ	½	32B4334	BTS-330K	AF Plate
R58	470KΩ 20%	½	32B5474	BTS-470K	Output Grid
R59	1000Ω 20%	1	32C5102	BW-1-1000	Filter
R60	1 Meg.20%	½	32B5105	BTS-1 Meg.	Sync. Amp. Grid
R61	15KΩ 20%	1	32C5153	BTA-15K	Sync. Amp. Plate
R62	3.9 Meg.	½	32B4395	BTS-3.9 Meg.	Sync. Sep. Grid
R63	6800Ω 5%	½	32B3682	BTS-6800-5%	Sync. Sep. Cathode
R64	22KΩ 20%	½	32B5223	BTS-22K	Integrator
R65	8200Ω	½	32B4822	BTS-8200	Integrator
R66	8200Ω	½	32B4822	BTS-8200	Integrator
R67	1 Meg.5%	½	32B3105	BTS-1 Meg-5%	Vert. Osc. Grid
R68	1.5 Meg.	½	32B4155	BTS-1.5 Meg.	Voltage Divider
R69	6.8Meg.20%	½	32B5685	BTS-6.8 Meg.	Voltage Divider
R70	100KΩ	½	32B4104	BTS-100K	Voltage Divider
R71	560Ω	½	32B4561	BTS-560	Vert. Amp. Cathode
R72	2.2Meg.20%	½	32B5225	BTS-2.2 Meg.	Vert. Amp. Grid
R73	3900Ω	½	32B4392	BTS-3900	Vert. Peaking
R74	100Ω 20%	½	32B5102	BTS-1000	Filter See Note 1
R75	560KΩ 5%	½	32B4564	BTS-560K-5%	Horiz. AFC Grid
R76	180KΩ	½	32B4184	BTS-180K	Horiz. AFC Cathode
R77	100KΩ 5%	1	32C3104	BTA-100K-5%	Horiz. AFC Cathode
R78	8200Ω	½	32B4822	BTS-8200	Horiz. AFC Filter Network
R79	150KΩ	½	32B4154	BTS-150K	Horiz. AFC Filter Network
R80	3.3Meg.5%	1	32C3335	BTA-3.3Meg. 5%	Voltage Divider
R81	100KΩ 1%	½	31B1104		Horiz. Osc. Grid
R82	10KΩ	½	32B4103	BTS-10K	Horiz. Osc. Transformer Shunt
R83	120KΩ	1	32C4124	BTA-120K	Horiz. Osc. Plate
R84	30KΩ	½	34A1		Voltage Divider Temp. Comp.
R85	120KΩ	½	32B4124	BTS-120K	Voltage Divider
R86	270KΩ	1	32C4274	BTA-270K	Voltage Divider
R87	47Ω 20%	½	32B5470		Parasitic Supp.
R88	1 Meg. 20%	½	32B5105	BTS-1 Meg.	Horiz. Output Grid
R89	82Ω	1	32C4820	BW-1-82	Horiz. Output Cathode (Wire Wound)
R90	4700Ω	1	32C4472	BTA-4700	Horiz. Output Screen
R91	10KΩ	½	32B4103	BTS-10K	Filter
R92	560KΩ	½	32B4564	BTS-560K	Feedback
R93	56KΩ	½	32B4563	BTS-56K	Feedback
R94	3.3Ω	½	43X238		HV Filament (Wire Wound)
R95	1 Meg. 20%	1	32C5105		HV Filter
R96	6800Ω 20%	1	32C5681	BTA-680	Focus Coil Shunt
R97	6800Ω 20%	1	32C5681	BTA-680	Focus Coil Shunt
R98A	11250Ω	20	43X234		Filter (Wire Wound)
B	610Ω	20			Bias Network (Wire Wound)
R99A	8200Ω	5		AB-8000	Bleeder (Wire Wound)
B	33Ω	.8	43X235	BW-1-33	Voltage Divider (Wire Wound)
C	100Ω	2		BW-2-100	Bias Network (Wire Wound)
R100	39Ω	1	32C4390	BW-1-39	Bias Network

Note 1. This value is 2200Ω in models 94TV2-43-8994A, 8973A, 8993A, 8987A, 8995A, 8972A
Note 2. Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	CORONADO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ 1.8A	730VCT .25ADC	5VAC @ 3A	5VAC @ 2A	53X297	P-8153	P-3063	TP-355
		SEC. 4 6.3VAC @ 6.1A	SEC. 5 6.3VAC @ .6A					

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	SEC.	REPLACEMENT DATA CORONADO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	150Ω Tap @ 41Ω		9A1984				Hor.Osc.Transformer
T3	165Ω	1310Ω	54X4	A-8121	A-4000	TBO-1	Vert.Osc.Transformer
T4	420Ω Tap. @ 180Ω	SEC. 1 10.6Ω Tap @ .6Ω	53X296	A-8117		TFB-2	Hor.Output Transformer
		SEC. 2 0Ω					
T5	590Ω	72	51X140	A-8115	A-3035	TSO-1	Vert.Output Transformer
T6A	14Ω		9A1987	DY-1			Hor.Deflection Coil
B	63Ω						Vert.Deflection Coil
T7	364Ω		9A1974	FC-10			Focus Coil

CORONADO MODELS 94TV2-43-8970A, 8971A, 8972A, 8973A, 8985A, 8986A, 8987A, 8993A, 8994A, 8995A

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CORONADO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T8	6200Ω	3.2Ω	350Ω	.5Ω	51X139	A-3878	A-2931	RO-13	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	CORONADO PART No.	JENSEN PART No.	QUAM PART No.	
SP1A	PM	3.2Ω	12A490 §	ST-102 MOD.P12-S‡	12A6A	‡ Replace output transformer to match 6-8Ω voice coil.
B	PM	3.2Ω	12A491 #		46A1	# Used in table model.
	CONE DIA.	V. C. DIA.				§ Used in console model.
SP2A	11 1/2"	1"				
B	4" x 6"	9/16"				

FILTER CHOKE

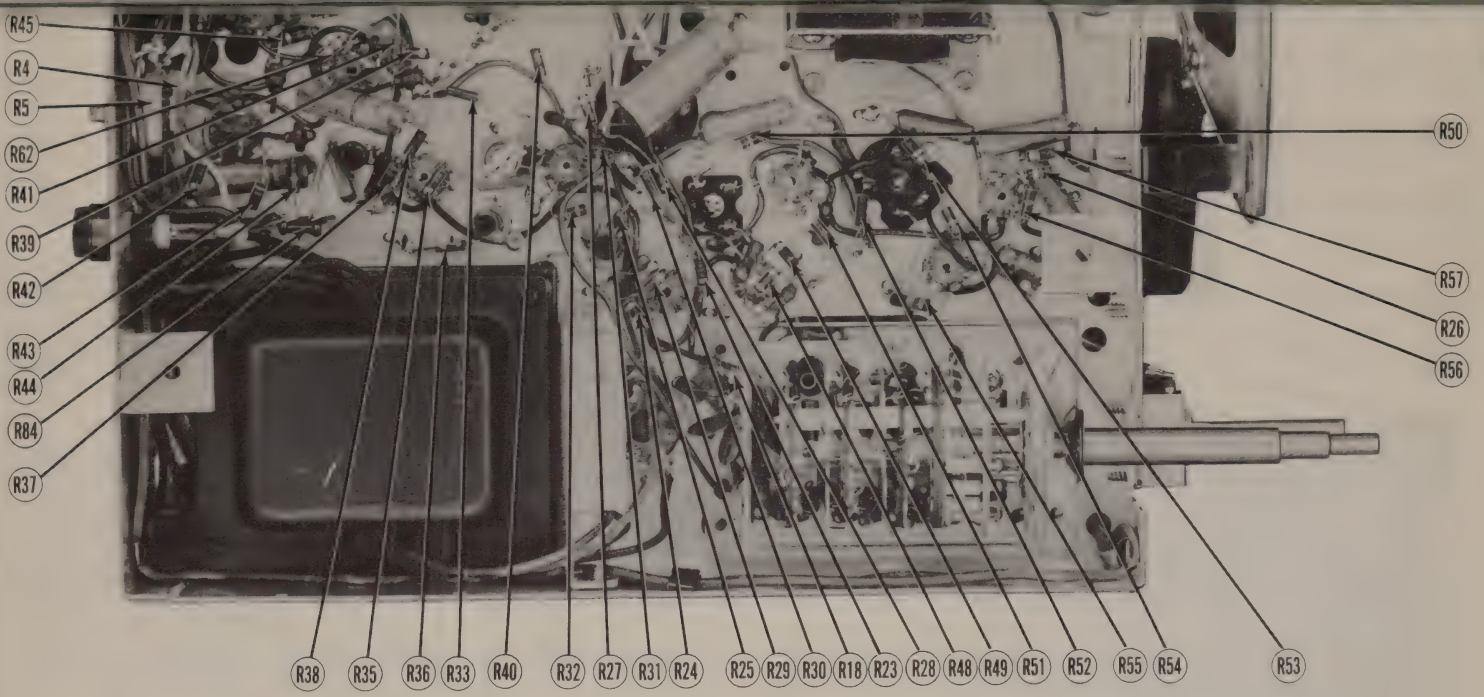
ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∽)	CORONADO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.250A	62Ω	2.2Henries	52X87	C-2326	C-2991	TR-3300	

COILS (RF-IF)

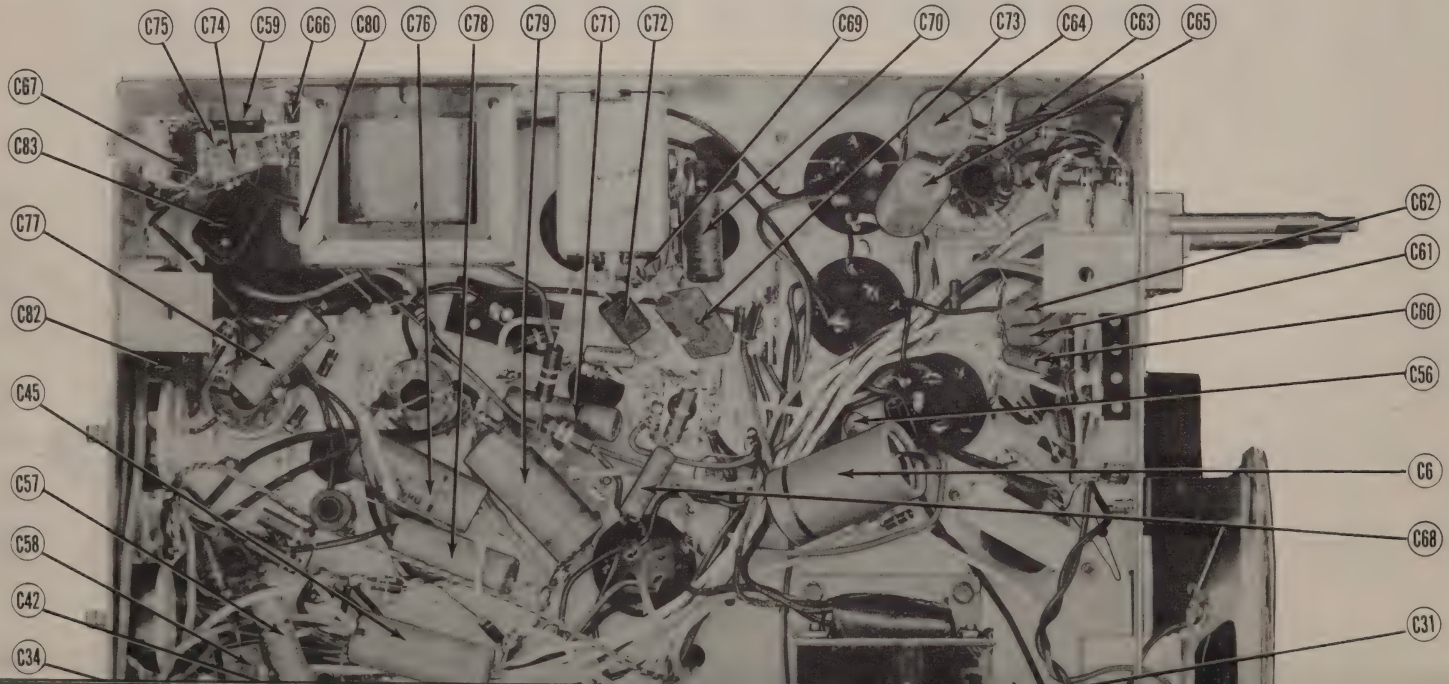
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	CORONADO PART No.	MEISSNER PART No.	
L2	Ant. Coil	0Ω				Part of tuner.
L3	Fil. Choke	.1Ω				Part of tuner.
L4	Fil. Choke	.1Ω				Part of tuner.
L5	Fil. Choke	.1Ω		9A2023		
L6	1st Video IF-Sound Take-Off	0Ω	0Ω	9A2035		
L7	2nd Video IF	.1Ω		9A198Q		
L8	3rd Video IF	.1Ω	0Ω	9A1982		
L9	Sound Trap	0Ω	0Ω	9A1985		
L10	4th Video IF	.1Ω		9A1980		
L11	Peaking	2.8Ω		9A1979		36 microhenries
L12	Peaking	6.2Ω		9A1977		180 microhenries. Wound on 39KΩ resistor
L13	Peaking	5.6Ω		9A1978		120 microhenries. Wound on 22KΩ resistor
L14	Peaking	2.8Ω		9A1979		36 microhenries.
L15	Peaking	5.6Ω		9A1978		120 microhenries. Wound on 22KΩ resistor
L16	Sound IF	0Ω	.1Ω	9A1986		
L17	Disc.Trans.	0Ω	0Ω	9A1983		
L18	Width Cont.	.1Ω		9A1976		
L19	Hor.Line-arity	36Ω		9A1981		

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M1	RF Tuner	S-25A3	
M2	Ion Trap	2A382	
M3	Fuse	16X133	Type GJV .25A
M4	Fuse	16X132	Type AGC 3A
	Escutcheon	4X1028	Mahogany, Channel
	Escutcheon	4X1029	Mahogany, Vert. and Horiz.
	Escutcheon	4X1038	Blond, Channel
	Escutcheon	4X1039	Blond, Vert. and Horiz.
	Knob	10A714	Brightness and Horizontal for Mahogany Cabinets
	Knob	10A715	On-Off Sound for Mahogany Cabinets.
	Knob	10A716	Contrast, Vertical On-Off Sound for Mahogany Cabinets.
	Knob	10A717	Fine Tuning for Mahogany cabinets.
	Knob	10A718	Channel Selector for Mahogany Cabinets.
	Knob	10A723	Fine Tuning for Blond Cabinets.
	Knob	10A724	Brightness and Horizontal for Blond Cabinets.
	Knob	10A725	Contrast, Vertical and On-Off Sound for Blond Cabinets.
	Knob	10A726	On-Off Sound for Blond Cabinets.
	Knob	10A727	Channel Selector for Blond Cabinets.
	Safety Glass	17X101	



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION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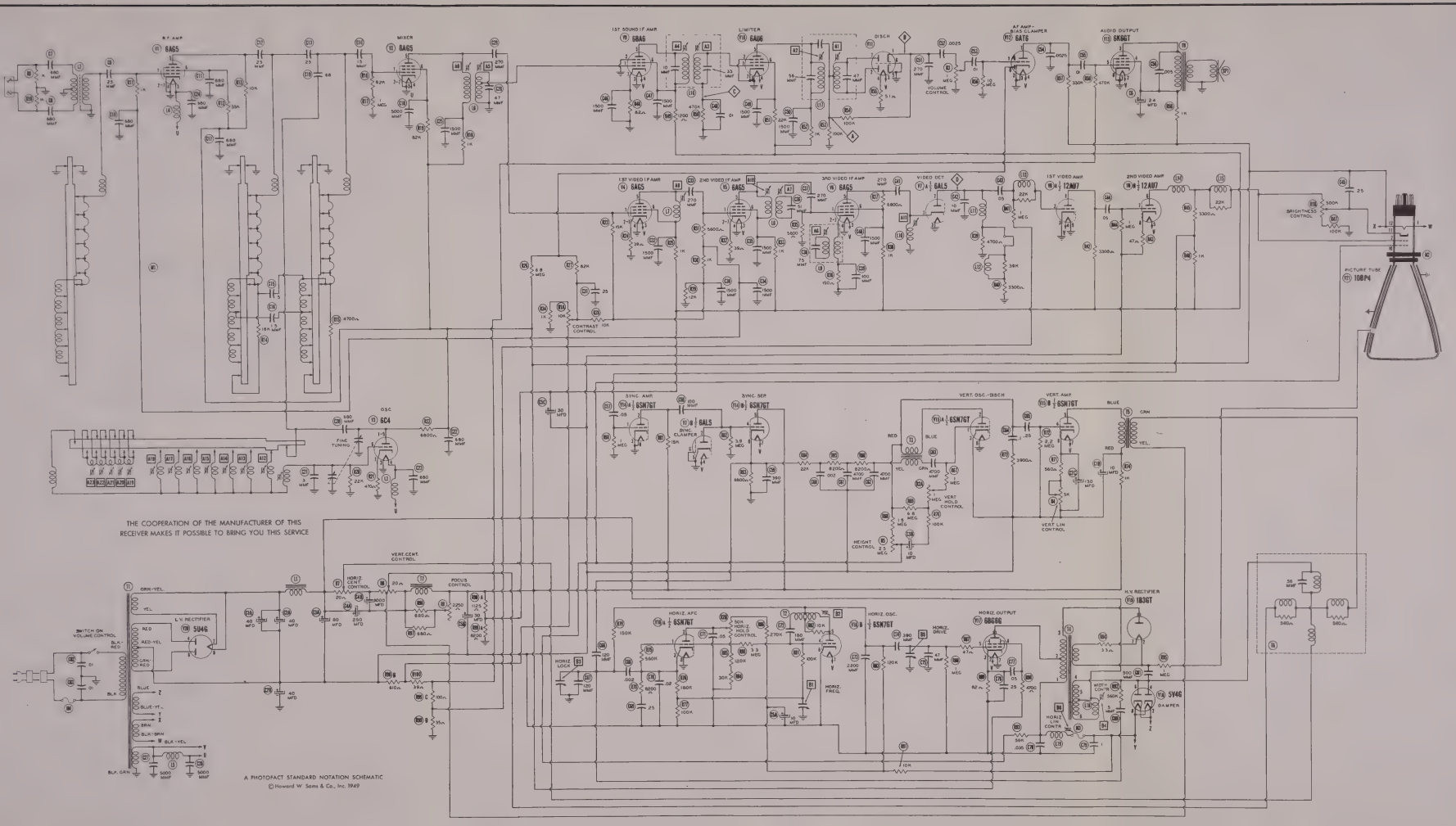
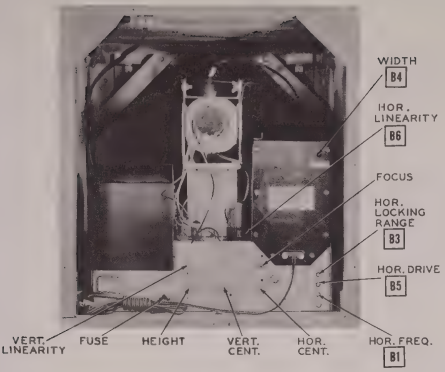


CORONADO MODELS 94TV2-43-8970A, 8971A, 8972A, 8973A, 8985A, 8986A, 8987A, 8993A, 8994A, 8995A



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ALIGNMENT CHECK

Tune in test pattern and turn horizontal hold control to extreme counter-clockwise position. Picture should remain in synchronization. Turn channel switch to another channel and then back to the original channel. Normally, the picture should be out of sync. Turn the hold control clockwise and the picture should slowly begin to synchronize and finally lock-in. This should occur when the control is approximately 90° from the extreme counter-clockwise position. The picture should remain in sync for another 90° in the clockwise direction of the control. At the extreme clockwise position the picture should again drop out of synchronization and 3½ to 4½ bars should be seen sloping downward to the right. If the receiver fails to hold synchronization during this check with the hold control at the extreme counter-clockwise position or fails to hold synchronization for at least 60° in the clockwise direction from the point when it drops into sync, it will be necessary to align the horizontal oscillator circuit as follows:

(A) HORIZONTAL OSCILLATOR ALIGNMENT

Turn the horizontal hold control to the extreme clockwise position. Tune in a test pattern and adjust trimmer B1 until the picture is out of sync and shows 3½ to 4½ bars sloping downward to the right. If the trimmer has insufficient range, set it to its mid-position (one turn from tight) and adjust slug B2 until bars appear.

(B) HORIZONTAL LOCKING ALIGNMENT

Turn the horizontal hold control to the fully counter-clockwise position. Switch to another channel and back to the original again. Slowly turn the hold control clockwise and note the least number of diagonal bars present just before the picture syncs. If more than 4½ bars are present just before the picture syncs, adjust trimmer B3 slightly clockwise. If less than 3½ bars are present, adjust B3 slightly counter-clockwise and switch the channel selector to another channel and back again. Recount bars present just before the "lock-in" point. Repeat this procedure until 3½ to 4½ bars are present. Repeat steps (A) and (B) until conditions exist as outlined under "Horizontal Oscillator Alignment Check".

WIDTH, DRIVE , & HORIZONTAL LINEARITY ADJUSTMENTS

Turn the width control B4 to maximum clockwise position. Adjust trimmer B5 for maximum brightness and linearity. Adjust horizontal linearity B6 for best linearity in the right half of the picture. Readjust the width control until the picture fills the mask.

TOP VIEW

CRESCENT
MODEL 250 SERIES

CRESCENT
MODEL 250 SERIES

GENERAL INFORMATION

This changer is a single-post changer designed to play automatically up to ten 12-inch records or twelve 10-inch records, not intermixed. The last record will be repeated until the changer is turned off.

Motors may be supplied for 105-125 volts, 50 or 60 cycles, and 220 volts, 50 or 60 cycles. A manual position is provided for playing off-standard or home recordings.

Manufactured by CRESCENT INDUSTRIES, INC., 4140 West Belmont, Chicago 41, Illinois

THE FOLLOWING MANUFACTURERS HAVE USED THIS RECORD CHANGER IN POSTWAR RECEIVERS:

Airadio, Incorporated	Melrose Avenue and Barry Place, Stamford, Conn.
Audio Industries	1001 Green Street, Michigan City, Indiana
General Television & Radio Corp.	2701 N. Lehmann Court, Chicago, Illinois
Hoffman Radio Corp.	3430 S. Hill Street, Los Angeles, Calif.
Jackson Industries, Inc.	1708 South State Street, Chicago 16, Illinois
Radio Corporation of America, RCA Victor Division	Camden, New Jersey
Sonora Radio & Television Corp.	325 N. Hoyne Avenue, Chicago, Illinois
Templetone Radio Mfg. Corp.	100 Garfield Avenue, New London, Conn.

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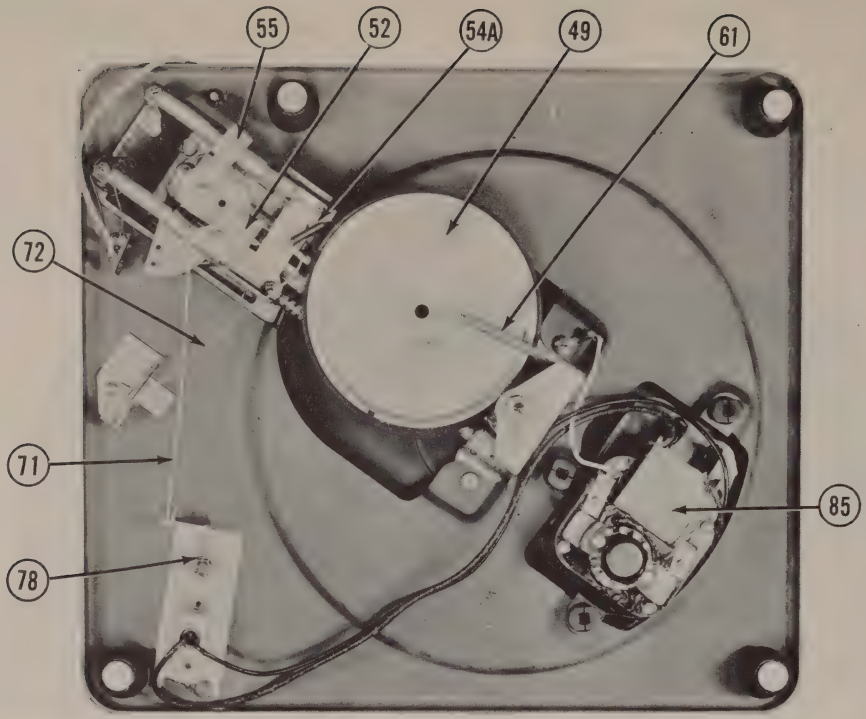
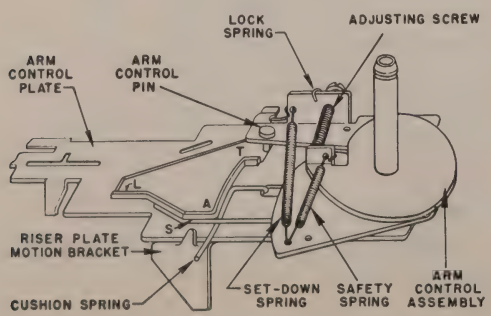


BOTTOM VIEW

OPERATING INSTRUCTIONS

To set the changer for correct size, rotate the record support and cover assembly a half turn until it snaps into place with the desired record size, which is indicated on the cover (1), toward the turntable. When changing the setting from 10-inch to 12-inch, rotate the assembly counterclockwise only; in changing from 12-inch to the 10-inch setting, rotate the assembly clockwise only. With the hold down pad (2) in a position pointing away from the spindle, place a stack of records on the spindle ledge, letting the records rest on the record support. Set the hold down pad on the records; push the control button to the "Auto.-On" position and press down on the reject button, which is located on top of the arm rest, or on the pickup arm if it is setting on the arm rest. The entire stack of records will be played automatically. Any record may be rejected by pressing the reject button.

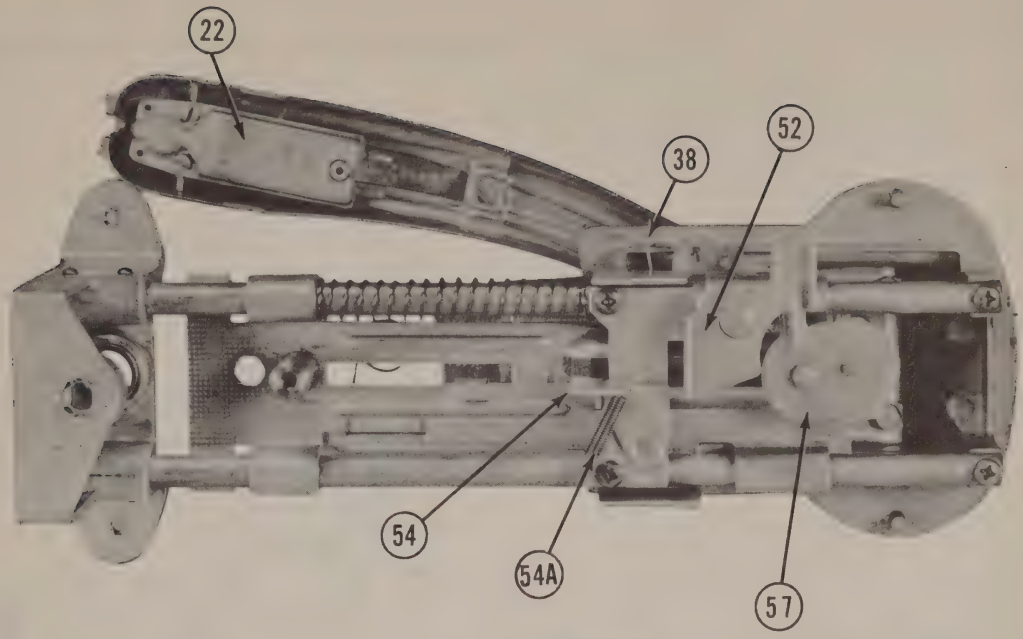


CHANGE CYCLE

As the pickup arm moves into the eccentric groove of the record, the arm control pin (28) of the arm control assembly (33) moves off the track (36) into the recess (T) of the arm control plate (37). This allows the arm control plate to slide toward the centerpost, which is actuated by the trip spring (34). As the control plate slides forward, the stop tab (35) is moved from behind the reject catch (46) of the eccentric cam (49). The eccentric cam, now free to move, is pulled over by the eccentric cam spring (61) until the rubber tire makes contact with the knurled roller (59). The knurled roller, which rotates with the turntable, rotates the eccentric cam. As the eccentric cam is rotated, the riser plate (41), which is attached to the cam, is pushed back along the guide rods.

As the riser plate travels backward, the push-off cam and shaft assembly (57) rides along the incline track (40) of the riser plate, thus pulling the push-off cam and shaft assembly down. This action causes the pickup arm lift assembly (15), which is fastened to the shaft, to contact the arm lift bearing pin of the pivot spring (16), thus causing the pickup arm to be raised clear of the records.

The riser plate tab (42) contacts and moves the arm control assembly (33); since the pickup arm support assembly (19) is fastened to control assembly, the pickup arm is pivoted out clear of the records.



BOTTOM VIEW LESS MOTOR BOARD

As the riser plate assembly (41) continues backward along the guide, the riser plate motion bracket (43) contacts the arm of the push-off cam (55) and rotates the cam and shaft assembly (57); as a result, the push-off arm (3), which is connected to the push-off cam and shaft assembly, actuates the push plate dropping a record to the turntable. At this point, the riser plate assembly (41) starts to move back toward the center-post due to the rotation of the eccentric cam (49) and pressure of the recoil spring (44). As the riser plate moves forward, the push plate spring (11) returns the push plate (9) and the arm (3) to their normal position. The set-down spring (30), pulling on the arm control assembly (33), now moves the pickup arm in for set down.

The push-off cam and shaft assembly (57) now rides down the incline track (40) of the riser plate (41), thereby lowering the pickup arm to the record. The eccentric cam completes its rotation by the aid of the eccentric spring (61); as a result, the tire of the cam is moved away from the knurled roller (59), and the reject catch (46) comes to a rest against the stop tab (35) of the arm control plate (37) and the reject arm (54). This completes the change cycle.

Description of the Set-Down Point

The set-down point of the pickup arm is determined by the distance the arm control plate (37) travels as the riser plate (41) moves away from the spindle. The distance the arm control plate travels is governed by the position of the push-off cam and shaft assembly (57) which is fastened to the push-off arm assembly (3). With the head assembly (8) in 10-inch position, the short radius of the cam (55) is nearest the size change stop (39); therefore, through further motion of the riser plate (41) and the arm control assembly (33), the arm control pin (28) will ride along the "L" portion of the control track (36), thus setting the position for 10-inch set down.

When the head assembly (8) is in 12-inch position, the long radius of the cam (55) is presented to the size change stop (39); as a result, the arm control pin (28) will ride in the "S" portion of the arm control plate (37) for the 12-inch setting.

As the pickup arm moves back toward the record during the second half of the cycle, it will be stopped directly above the set-down point when the bracket (32) of the arm control assembly reaches the adjusting screw (29). How far the arm moves in before being stopped depends on whether the arm control pin has been riding in the "S" or the "L" portion of the arm control track.

Reject Mechanism

When the reject button (64) is pressed, it causes the reject lever (73) to pull the trigger wire (72) which, in turn, pulls the reject arm (54) from behind the reject catch (46). The eccentric cam is then pulled against the knurled roller by the spring (61), thus starting the change cycle.

Manual Operation

To operate the changer manually, move the control

A PHOTOFACT "EXPLODED" VIEW
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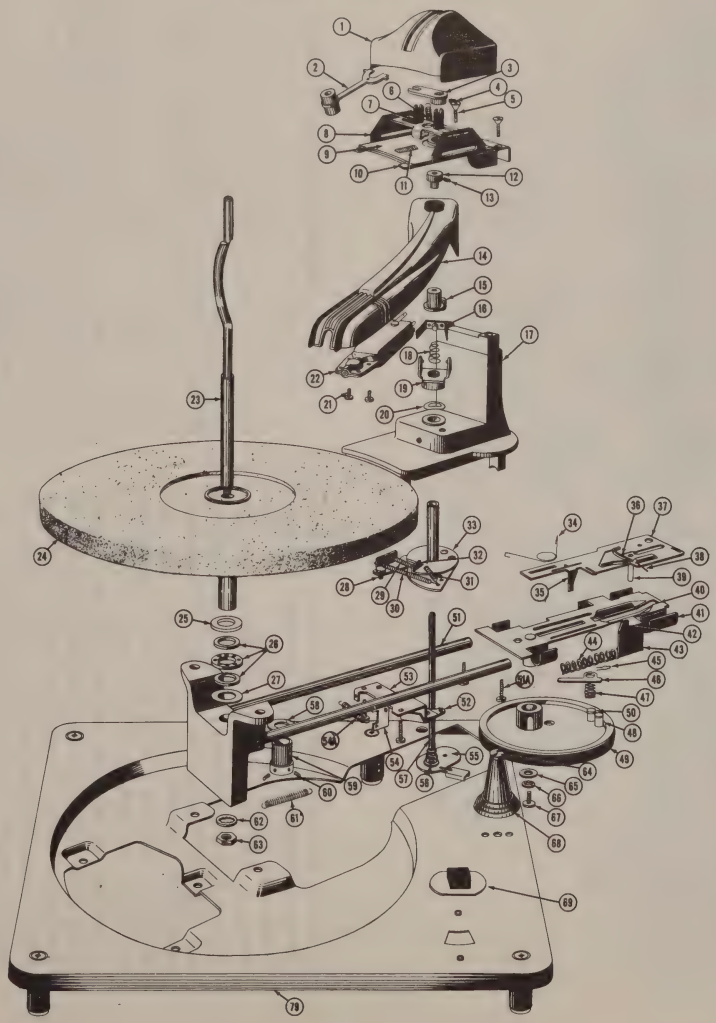

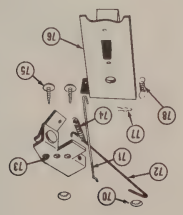
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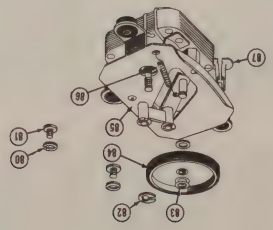
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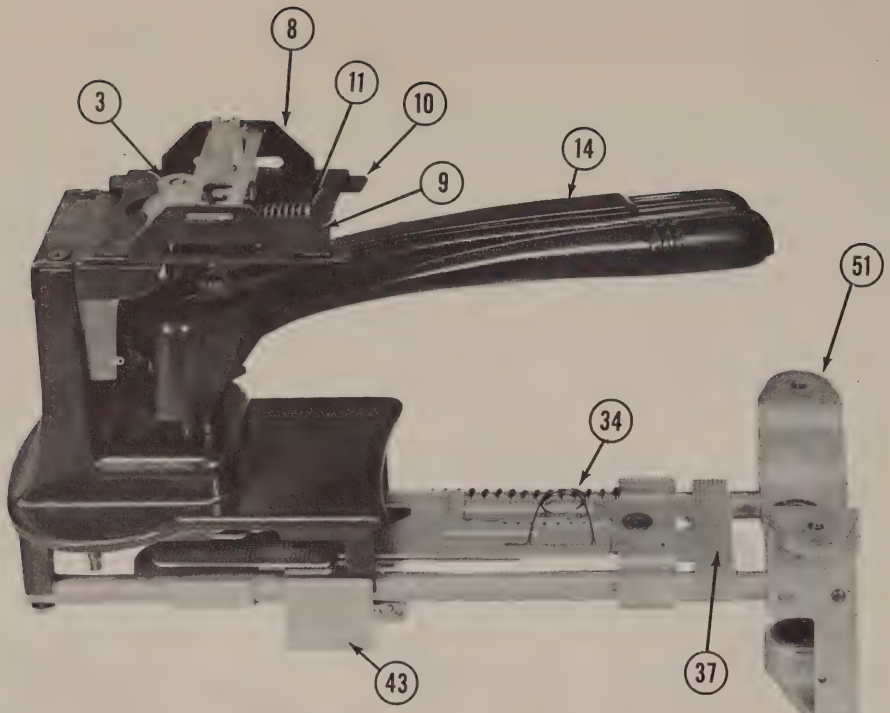


CHANGE MECHANISM—SIDE VIEW

knob (69) to the left. This will move the switch mounting to the left, causing the control wire (71) to pivot the control bracket (52) in the path of the size change stop (39). This action blocks the motion of the control plate, thereby preventing the eccentric cam from being tripped.

ADJUSTMENTS

Set-Down and Trip Point

This changer is designed so that the 10-inch set-down, the 12-inch set-down, and the trip point are simultaneously adjusted in a single operation. It is recommended that the adjustment be made at either of the set-down points. The adjustment is made by the adjusting screw (29). Turning this screw counterclockwise will cause the pickup arm to set down closer to the centerpost; turning it clockwise will cause the arm to set down further away from the centerpost.

Repositioning Push-Off Arm

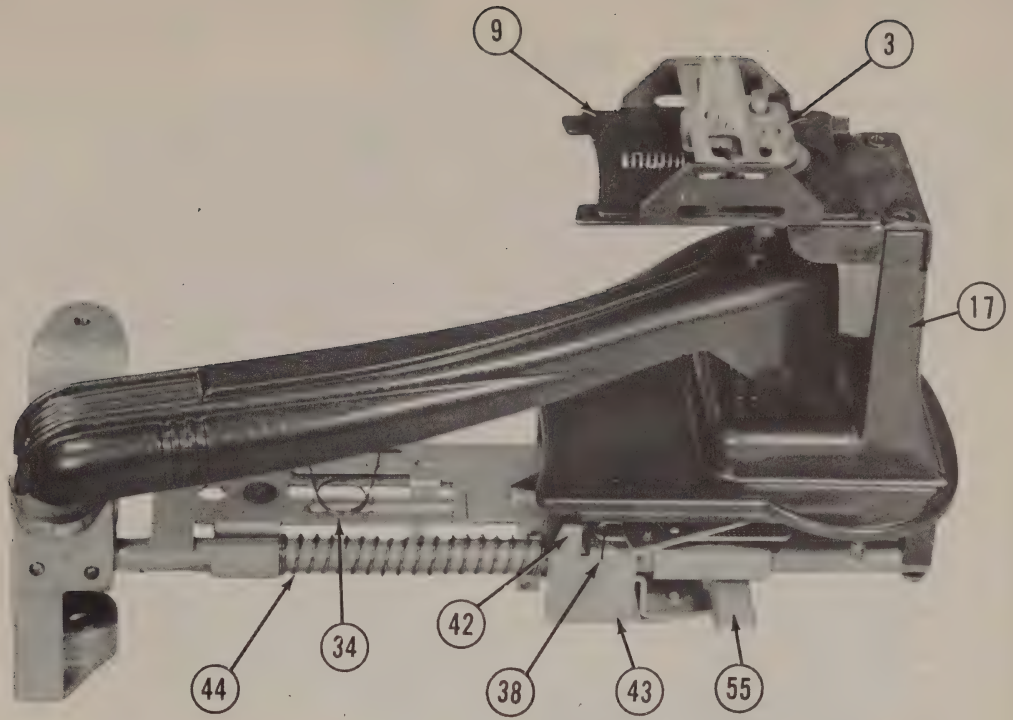
If the set screws (4) in the push-off arm (3) are loose, or if the push-off arm has been removed, it may be adjusted as follows:

1. Rotate the record support to the 10-inch position. Remove push-off arm (3).
2. Line up the push-off cam (55) with the push-off arm (3) so they are parallel, leaving about 1/32″ between the push-off arm and the top of arm lift shaft.
3. Tighten the set screw (4) and check the adjustment with 10-inch and 12-inch records.
4. If the push-off is still incorrect, set the push-off cam (55) slightly back of the push-off arm (3); this will give a little less push on 10-inch side and a little more on the 12-inch side. Reverse this procedure for more push-off on the 10-inch side.

Pickup Arm Height

The height of the pickup arm depends on the location of the lift adjusting collar (12). The correct height of the pickup arm should be that, without a needle and with a single record on the turntable, the bottom of the pickup arm should be about 1/32″ above the record. The pickup arm height may be adjusted as follows:

1. The changer should be out of cycle.
2. Place a single record on the turntable.
3. Remove the needle and place the pickup arm on the record close to its edge.
4. Loosen the set screw (13) in the lift adjusting collar (12).
5. Take up the play by pushing up on the push-off cam and shaft assembly (57). Do not compress the arm lift shaft spring (56).
6. While holding the cam and shaft assembly in this position, slide the lift adjusting collar (12) down until it is snug against the pickup arm lift (15).
7. Tighten set screw (13) in the lift adjusting collar.
8. Check height. If still incorrect, it may be necessary to repeat the adjustment. Before doing so, check the shaft (57) for nicks and burrs made by the set screws.



CHANGE MECHANISM—TOP-SIDE VIEW

Repositioning Pickup Arm Support Assembly

1. The adjustment is made by turning the adjusting screw (29) clockwise two full turns.

2. Place a 12-inch record on the turntable.

3. Loosen the two set screws in the pickup arm support assembly (19).

4. With the changer out of cycle, move the arm control assembly (33) outward as far as it moves freely. In this position the arm control pin (28) will be located at point "A" on the track of the arm control plate (37).

5. Place the pickup arm so that the needle rests in the first playing groove on the 12-inch record.

6. Tighten the two set screws in the pickup arm support assembly (19).

7. Make final set-down adjustment as described in adjustment of "Set Down and Trip Point."

TROUBLES

Failure to Trip on Completion of Record

1. Trip spring (34) broken or too weak to actuate the arm control plate (37).

2. Spring (61) loose, thereby not pulling eccentric arm around to make contact with the knurled roller (59).

Continuous Tripping

1. Reject arm spring (54A) loose or missing; as a result, the reject arm (54) will not be held in the path of the reject catch (46) which holds the eccentric cam away from the knurled roller.

2. The reject catch (46) bent, thereby passing under the stop tab (35) of the arm control plate.

3. Spring (47) not holding the reject catch (46) up properly. This will allow the reject catch to pass under the stop tab and reject arm.

Pickup Arm Fails to Set Down Properly

1. The set screws in the pickup arm support (19) loose.

2. Set screw (13) of the lift adjusting collar (12) loose.

3. The adjusting screw (29) out of adjustment; check on adjustments of the pickup arm.

Records Fail to Drop to Turntable

1. The set screws of the push-off arm loose.

Turntable Speed Irregular

1. Grease on the rim of the turntable and rubber tire of the idler wheel. Clean with carbon tetrachloride.

2. Idler wheel spring (86) weak and not holding idler wheel in a positive frictional position with the turntable rim.

Stalls During Change Cycle

1. Grease on turntable rim.

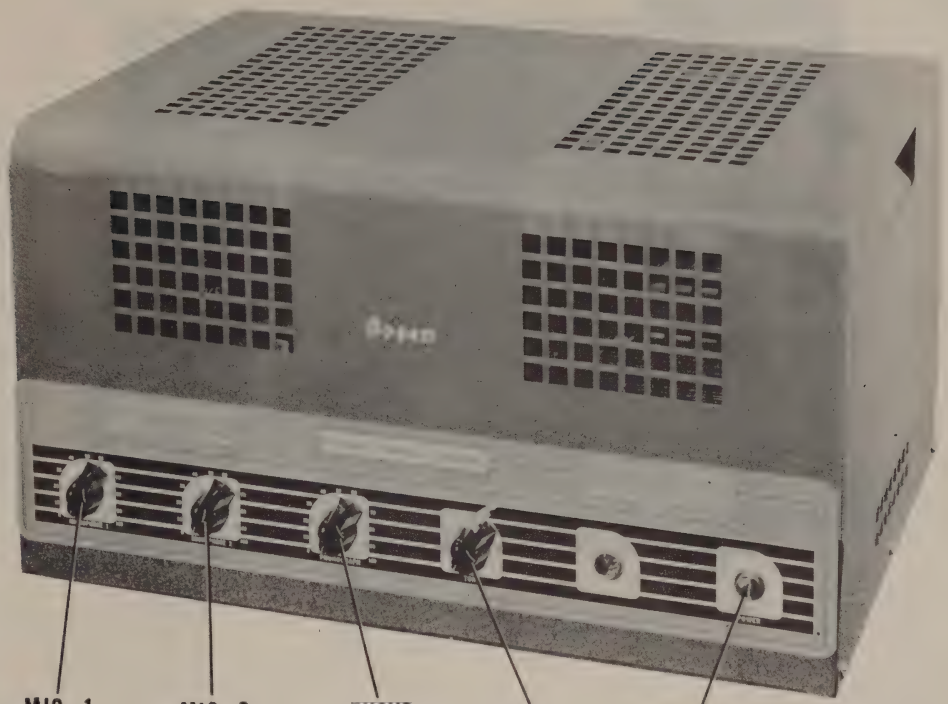
2. Check mechanism parts for binding.

3. If turntable continues to rotate, but changer mechanism stalls, check the set screws (60) of the knurled roller (59).

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	2C3-B2	Cover
2	2C3-A1	Hold down pad
3	G400-A66	Push-off arm assembly
4	1A44-37	Set screw (bristol head No. 6-32 x 1/8)
5	6C-312	Screw (No. 6 x 5/16" Phillips flat hd. type Z)
6	405-A4	Hold down spring
7	2C1-A14	Hold down plate
8	C250-A3	Head assembly
9		Push plate (part of 8)
10		Rotating plate (part of 8)
11	405-A33	Push plate spring
12	402-A57	Lift adjusting collar
13	1A44-38	Set screw (bristol head No. 6-32 x 3/16)
14	C250-A8	Pickup arm, pivot spring and arm lift bearing pin assembly
15	G400-A86	Pickup arm lift assembly
16	C250-A9	Pivot spring complete
17	2C4-C1	Base casting
18	405-A46	Brake spring
19	G400-A73	Pickup arm support assembly
20	405-A27	Spring washer
21	42-250	Screw (No. 4-40 x 1/4" fil. H.M.S.)
22	409-A1	Pickup cartridge } Interchangeable
	409-A2	Pickup cartridge } Interchangeable
	409-A3	Pickup cartridge } Interchangeable
23	G400-B21	Center post
24	C250-B13	Turntable
25	412-A1	Cork washer
26	415-A2	Thrust bearing assembly (replace as a unit)
27	412-A9	Cork washer
28		Arm control pin (part of 33)
29	402-A60	Adjusting screw
30	405-A49	Set-down spring
31	405-A41	Safety spring
32		Bracket (part of 33)
33	C250-A10	Arm control assembly
34	405-A43	Trip spring
35		Stop tab (part of 37)
36		Track (part of 37)
37	C250-A11	Arm control plate
38	405-A45	Cushion spring
39		Size change stop (part of 37)
40		Inclined track (part of 41)
41	C250-A12	Riser plate assembly
42		Riser plate tab (part of 41)
43		Riser plate motion bracket (part of 41)
44	405-A9	Recoil spring
45	405-A15	Hairpin spring
46	2C1-A8	Reject catch
47	405-A50	Reject catch support spring
48		Reject catch stop stud (part of 49)
49	G400-A117	Eccentric cam and tire assembly
50		Reject catch pivot stud (part of 49)
51	C250-B14	Turntable mounting and guide rod assembly
51A	6C-625	Screw (No. 6 x 5/8 fil. hd. type Z)
52		Manual control bracket (part of 53)
53	C250-A6	Reject manual control assembly
54		Reject arm
54A	405-A25	Reject arm spring
55		Push-off cam (part of 57)
56		Arm lift shaft spring (part of 57)
57	G400-A98	Push off cam and shaft assembly
58		Cork washer
59	2C2-A1	Knurled roller, turntable shaft
60	1A44-13	Set screw (bristol head No. 8-32 x 1/8")
61	405-A47	Eccentric spring
62	3B1-29	Lockwasher 1/4" I.D.
63	402-A41	Hex nut (1/4"-20; used on centerpost)
64		Reject button (part of 68)
65	4B1-57-47	Flat washer (eccentric cam)
66	3B1-26-47	Lock washer No. 8 I.T.
67	84-250	Screw (B.H.M.S. No. 8-32 x 1/4")
68	C250-A15	Arm rest assembly
69	2C3-B3	Control knob
70	2C5-A5	Faston washer
71	2C14-A2	Manual control wire
72	414-A13	Reject trigger wire
73	C250-A16	Reject lever assembly
74	405-A25	Reject lever spring
75	1A20-14-21	Screw (No. 6 x 3/8")
76	C250-A5	Switch mounting assembly
77	405-A15	Hairpin spring
78		Main control spring
79	C250-B2	Motorboard assembly
80		Lock washer
81		Mounting screw (8-32 x 1/4")
82		"C" washer
83		Fiber washer
84	G400-A57	Idler wheel assembly (used with motor 407-B1 only)
	G400-A59	Idler wheel assembly (used with motor 407-B10 only)
	C250-A17	Idler wheel assembly (used with motor 407-B9 only)
85	407-B1	Motor, complete with idler wheel; 105-125 volts, 60 cycles (motors 407-B9, 407-B10 are interchangeable with 407-B1)
	407-B6	Motor, complete with idler wheel; 105-125 volts, 50 cycles (motors 407-B7, 2C7-B1 are interchangeable with 407-B6)
	2C7-B2	Motor, complete with idler wheel; 220 volts, 60 cycles (motors 2C7-B4, 2C7-B6 are interchangeable with 2C7-B2)
	2C7-B3	Motor, complete with idler wheel; 220 volts, 50 cycles (motors 2C7-B5, 2C7-B7 are interchangeable with 2C7-B3)
86	405-A35	Spring, idler wheel (used with motor 407-B1 only)
	405-A36	Spring, idler wheel (used with 407-B10 only)
	2C5-A6	Spring, idler wheel (used with motor 407-B9 only)
87	2C5-A3	Motor snap fasteners, motor mounting

DAVID BOGEN
MODELS H50, HL50, H2L50



DAVID BOGEN
MODELS H50, HL50, H2L50

DAVID BOGEN MODEL H50

TRADE NAME	David Bogen, Models H50, HL50, H2L50
MANUFACTURER	David Bogen Co., Inc. 663 Broadway, New York 12, New York
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES(NINE)	Types 6SC7 Mic. 1 Pre.-Amp., 6SC7 Mic. 2 Pre.-Amp., 6SC7 1st AF Amp., 6SL7GT 2nd AF-Phase Inv., 6SN7GT Driver, (2) 807 Power Output, 5Y3GT Rectifier, 5R4GY Rect.
POWER SUPPLY	110-120 Volts AC RATING: 1.54 Amp. @ 117 Volts AC

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DATE 11/49 SET #78 FOLDER 6

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DAVID BOGEN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Mic. #1 Pre-Amp.	6SC7	6SC7	8S	
V2	Mic. #2 Pre-Amp.	6SC7	6SC7	8S	
V3	1st AF Amp.	6SC7	6SC7	8S	
V4	2nd AF Amp.- Phase Inverter	6SL7GT	6SL7GT	8BD	
V5	Driver	6SN7GT	6SN7GT	8BD	
V6	Power Output	807	807	T-5BB	
V7	Power Output	807	807	T-5BB	
V8	Rectifier	5Y3GT	5Y3GT	5T	
V9	Rectifier	5R4GY	5R4GY	5T	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: D. BOGEN PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
R1	25KΩ	½	V-259B		M-41-W	Microphone 1 volume control
R2	25KΩ	½	V-259B		M-41-W	Microphone 2 volume control
R3	500KΩ	½	V-202B	Q13-133	M-60-Z	Phono volume control
R4	1 Meg.	½	V-129C			Tone control, tapped @ 50K

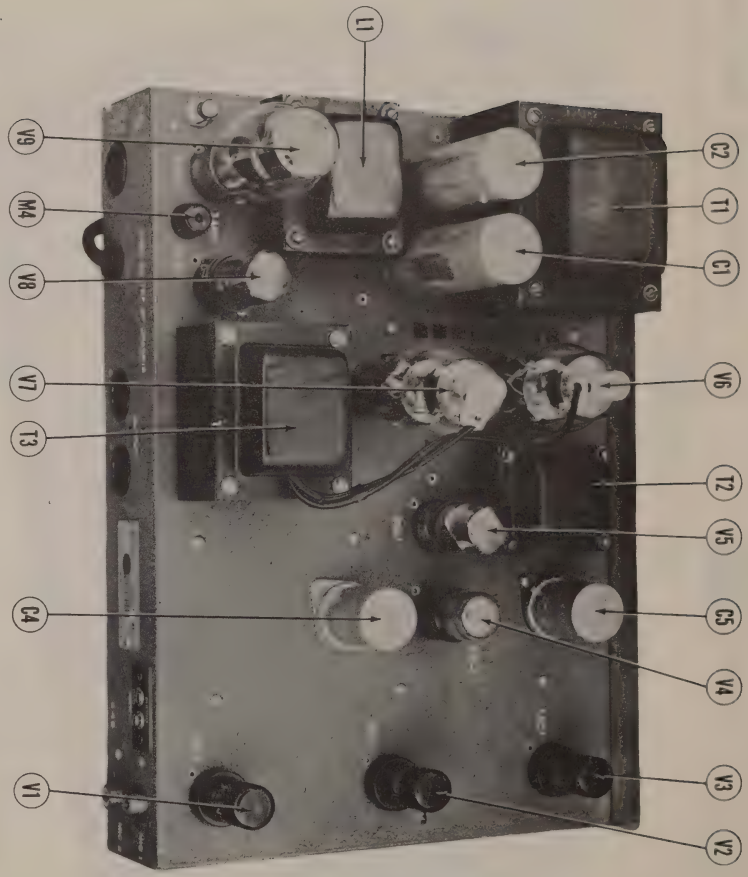
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DAVID BOGEN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	4	600		GL600/4	TLAD6040		AP-46	Filter
C2A	8	500		GL475/8-8	EB10018		CL-88	Filter Red-Black
B	8	500						Filter Blue-Yellow
C3	50	50		PRS50/50	BR505		TVA-16	Bias Filter
C4A	10	450		AF22J ‡	UP5Q45 †		EL-210‡	▲ Decoupling
B	10	450						◓ Decoupling
C5A	5	450		AF2222J	UP5Q45		EL-410	◓ Decoupling
B	5	450						■ Decoupling
C	5	450						▲ Decoupling
D	5	450						Decoupling
C6	25	25		PRS25/25	BR252A		TVA-6	Cathode Bypass Note 1
C7	25	25		PRS25/25	BR252A		TVA-6	Cathode Bypass Note 1
C8	100	25		PRS25/100	BRH251A		UHC-102	Cathode Bypass
C9	25	25		PRS25/25	BR252A		TVA-6	Cathode Bypass Note 1
C10	100	25		PRS25/100	BRH251A		UHC-102	Cathode Bypass
C11	100	25		PRS25/100	BRH251A		UHC-102	Cathode Bypass
C12	.05	400		P488-05	GT4S5		TM-15	Audio Coupling
C13	.25	400		P488-25	GT4P25		TC-2	Audio Coupling
C14	100	500		1468-0001	5W5T1	GP1K-100	1FM-31	Tone Compensation
C15	100	500		1468-0001	5W5T1	GP1K-100	1FM-31	Tone Compensation
C16	.05	400		P488-05	GT4S5		TM-15	Audio Coupling
C17	.25	400		P488-25	GT4P25		TC-2	Audio Coupling
C18	250	500		1468-00025	5W5T25	GP2K-250	1FM-325	Audio Coupling
C19	.05	400		P488-05	GT4S5		TM-15	Audio Coupling
C20	.01	400		P488-01	GT4S1	GP2-335-01	TM-11	Tone Compensation
C21	500	500		1468-0005	5W5T1	GP2K-500	1FM-35	Tone Compensation
C22	.001	600		P688-001	GT6D1	GP2L-001	TM-21	Tone Compensation
C23	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C24	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C25	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C26	.02	1200		P1688-02	GT16D2		MI-12	Tone Compensation
C27	.1	500		P688-1	GT6P1		TM-1	Line Filter

Note 1. Some models use 100MFD @ 25 volts in this application.
† Parallel sections to obtain desired capacity.
‡ Use new mounting plates.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA DAVID BOGEN PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
R5	500KΩ	½		BTS-470K	Mic. 1 Pre.-Amp. Grid
R6	1000Ω	½		BTS-1000	Mic. 1 Pre.-Amp. Cathode
R7	220KΩ	½		BTS-220K	Mic. 1 Pre.-Amp. Plate
R8	500KΩ	½		BTS-470K	Mic. 1 Pre.-Amp. Grid
R9	150KΩ	½		BTS-150K	Mic. 1 Pre.-Amp. Plate
R10	100KΩ	½		BTS-100K	Feedback
R11	100KΩ	½		BTS-100K	Decoupling
R12	500KΩ	½		BTS-470K	Mic. 2 Pre.-Amp. Grid
R13	1000Ω	½		BTS-1000	Mic. 2 Pre.-Amp. Cathode
R14	220KΩ	½		BTS-220K	Mic. 2 Pre.-Amp. Plate
R15	500KΩ	½		BTS-470K	Mic. 2 Pre.-Amp. Grid
R16	150KΩ	½		BTS-150K	Mic. 2 Pre.-Amp. Plate
R17	100KΩ	½		BTS-100K	Feedback
R18	100KΩ	½		BTS-100K	Decoupling
R19	220KΩ	½		BTS-220K	Tone Compensation
R20	2MΩ	½		BTS-2M	Isolation
R21	22KΩ	½		BTS-22K	Isolation
R22	2200Ω	½		BTS-2200	1st AF Cathode
R23	47KΩ	½		BTS-47K	Feedback
R24	220KΩ	½		BTS-220K	1st AF Plate
R25	47KΩ	½		BTS-47K	1st AF Plate Decoupling
R26	22KΩ	½		BTS-22K	Decoupling
R27	330KΩ	½		BTS-330K	Tone Compensation
R28	500KΩ	½		BTS-470K	2nd AF Grid
R29	470Ω	1		BTA-470	2nd AF Cathode
R30	3300Ω	½		BTS-3300	2nd AF Cathode
R31	220KΩ	½		BTS-220K	2nd AF Plate
R32	150KΩ	½		BTS-150K	Phase Inv. Grid
R33	100KΩ	½		BTS-100K	Phase Inv. Grid
R34	390Ω	½		BTS-3900	Phase Inv. Cathode
R35	220KΩ	½		BTS-220K	Phase Inv. Plate
R36	10KΩ	½		BTS-10K	Decoupling
R37	10KΩ	½		BTS-10K	Decoupling
R38	1 Meg.	½		BTS-1 Meg.	Driver Grid
R39	150Ω	½		BTS-1500	Driver Cathode
R40	150Ω	½		BTS-1500	Driver Cathode
R41	1 Meg.	½		BTS-1 Meg.	Driver Grid
R42	47KΩ	½		BTS-47K	Feedback
R43A	10KΩ	20		DG-10K	Bleeder (Wire Wound)
B	40KΩ	30		EP-40K	Bleeder (Wire Wound)
R44	1000Ω	25		DHA-1000*	Bias Network, Wire Wound Adjustable
R45	47KΩ	½		BTS-47K	Series Neon
R46	47KΩ	½		BTS-47K	Series Neon

* Set adjustable band 600Ω from ground end.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA DAVID BOGEN PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.
T1	117VAC @ 1.54A	1180VCT .051ADC	610VCT @ .118 AGC	5VAC @ 2A	T561-2			
		SEC. 4 5VAC @ 2A	SEC. 5 6.3VAC @ 3.6A					

DATE 11/49 SHT PAGE FOLDER 6

TRANSFORMER (DRIVER)

ITEM No.	RATING INDUCTANCE	RATING DC RES.	REPLACEMENT DATA DAVID BOGEN PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
T2	10 Henries CT	140Ω CT	T118-1				

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA DAVID BOGEN PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
T3	3KΩ CT	500Ω 125Ω 15Ω 8Ω 4Ω	68Ω CT	8.2Ω .4Ω .32Ω .25Ω .2Ω	T256-1	A-3301 §			§ Drill new mounting holes.

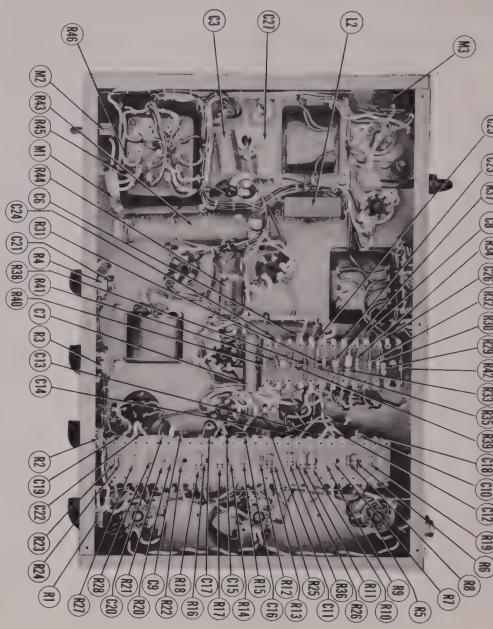
FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA DAVID BOGEN PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
L1	.061A	50Ω	2.5Henries	T510-1	C-2304 §	C-3196 §	§TR-4200	§ Drill new mounting holes.
L2	.118A	19Ω	5.5Henries	T501	C-2303 #	C-2993 #	R-8120 #	# Drill one new mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	DAVID BOGEN PART No.	NOTES
M1	Lamp		Neon NE51
M2	Switch		On-Off
M3	Switch		Interlock
M4	Fuse		AGC 3 Amp.

CHASSIS—BOTTOM VIEW



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6SC7	0V	75VDC	♦0V	0V	80VDC	.9VDC	#	#	
V 2	6SC7	0V	75VDC	♦0V	0V	80VDC	.9VDC	#	#	
V 3	6SC7	0V	85VDC	0V	0V	100VDC	1.5VDC	#	#	
V 4	6SL7GT	+1VDC	150VDC	2.2VDC	55VDC	190VDC	72VDC	#	#	
V 5	6SN7GT	-3.2VDC	300VDC	-10VDC	-17VDC	300VDC	-10VDC	#	#	
V 6	807	#	300VDC	-25VDC	0V	#				TOP CAP 510VDC
V 7	807	#	300VDC	-25VDC	0V	#				TOP CAP 510VDC
V 8	5Y3GT	0V	310VDC	0V	310VDC	0V	310VDC	0V	310VDC	
V 9	5R4GT	0V	515VDC	0V	600VAC	0V	600VAC	0V	515VDC	

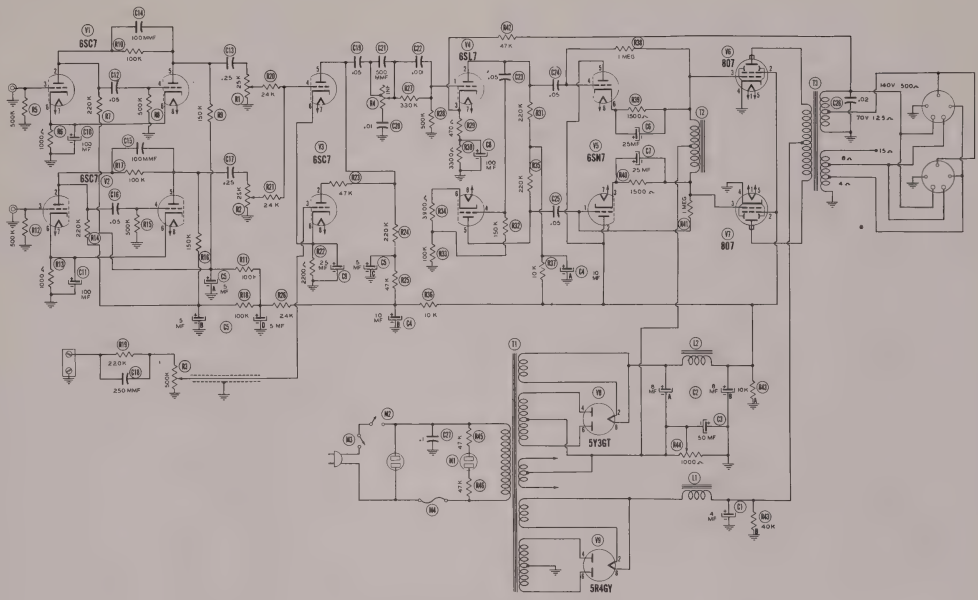
6.3VAC measured across filaments

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6SC7	0Ω	110KΩ	♦470KΩ	47ΩΩ	110KΩ	100Ω	70KΩ	70KΩ	
V 2	6SC7	0Ω	120KΩ	♦470KΩ	47ΩΩ	110KΩ	100Ω	70KΩ	70KΩ	
V 3	6SC7	0Ω	135KΩ	60Ω	12KΩ	127KΩ	2.2KΩ	70KΩ	70KΩ	
V 4	6SL7GT	47KΩ	1.2MΩ	3.8KΩ	250Ω	1.2MΩ	14KΩ	70KΩ	70KΩ	
V 5	6SN7GT	1 Meg.	120Ω	2KΩ	1 Meg.	120Ω	2KΩ	70Ω	70Ω	TOP CAP ▲80Ω
V 6	807	70Ω	120Ω	70Ω	0Ω	70Ω				TOP CAP ▲80Ω
V 7	807	70Ω	120Ω	70Ω	0Ω	70Ω				
V 8	5Y3GT	Inf.	20KΩ	Inf.	75Ω	Inf.	75Ω	Inf.	20KΩ	
V 9	5R4GT	Inf.	5KΩ	Inf.	38Ω	Inf.	35Ω	Inf.	50KΩ	

† Measured from pin 8 of V8
▲ Measured from pin 8 of V9
♦ Input jack open

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.



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805, 806, 807, 809, 817, 821 SERIES

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MODEL 821

GENERAL ELECTRIC MODELS
805, 806, 807, 809, 817, 821 SERIES

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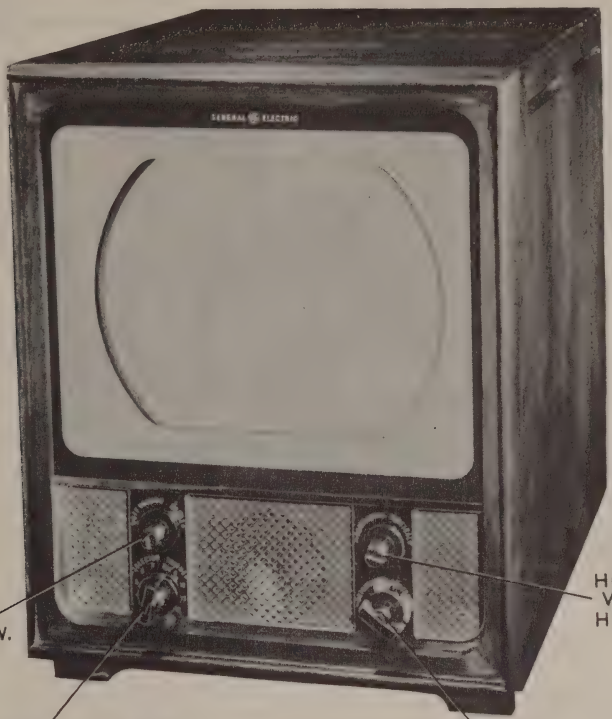

GENERAL ELECTRIC MODEL 821

TRADE NAME	GE Models 805, 806, 807, 809, 817, 821 Series
MANUFACTURER	General Electric Co., Electronics Dept., Electronic Park, Syracuse, New York
TYPE SET	TV Receiver
TUBES	Twenty

POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 1.22 Amp. @ 117 Volts AC
TUNING RANGE—Channels 2 thru 13

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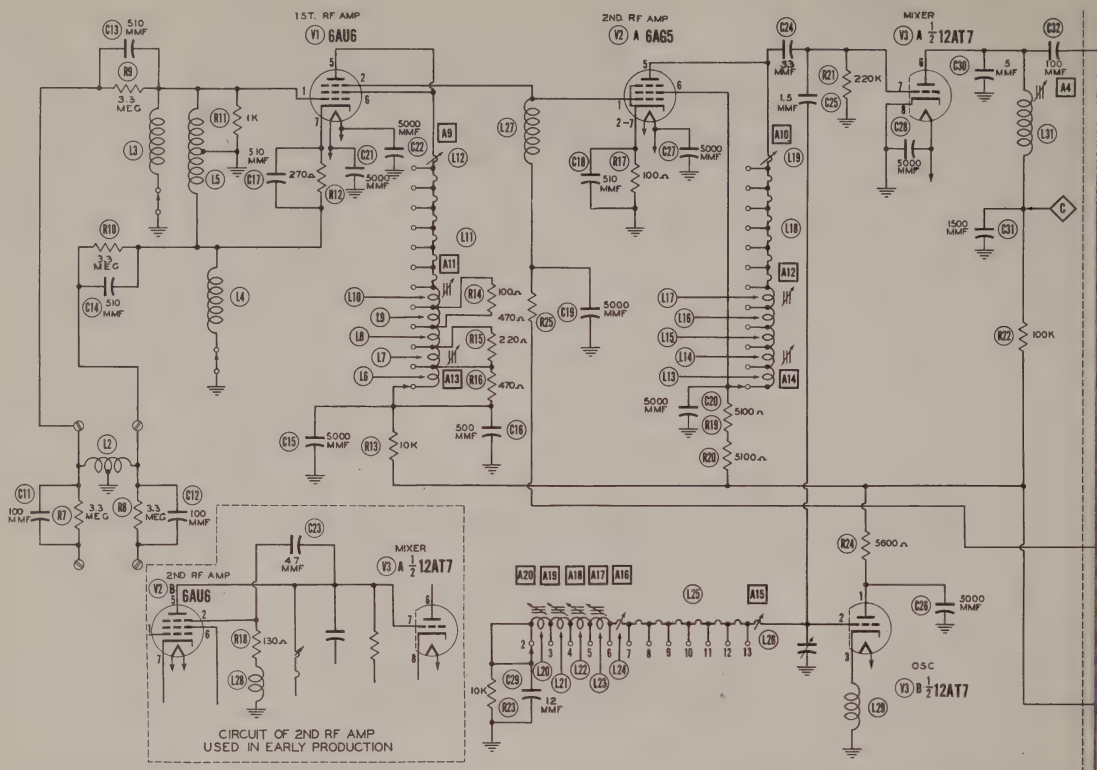
DATE 11/49 SET #78 FOLDER #7

GENERAL ELECTRIC MODELS
805, 806, 807, 809, 817, 821 SERIES



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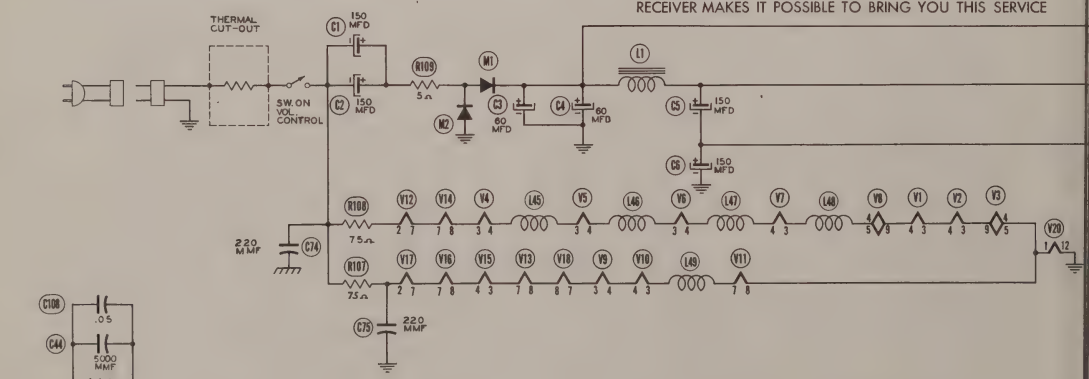

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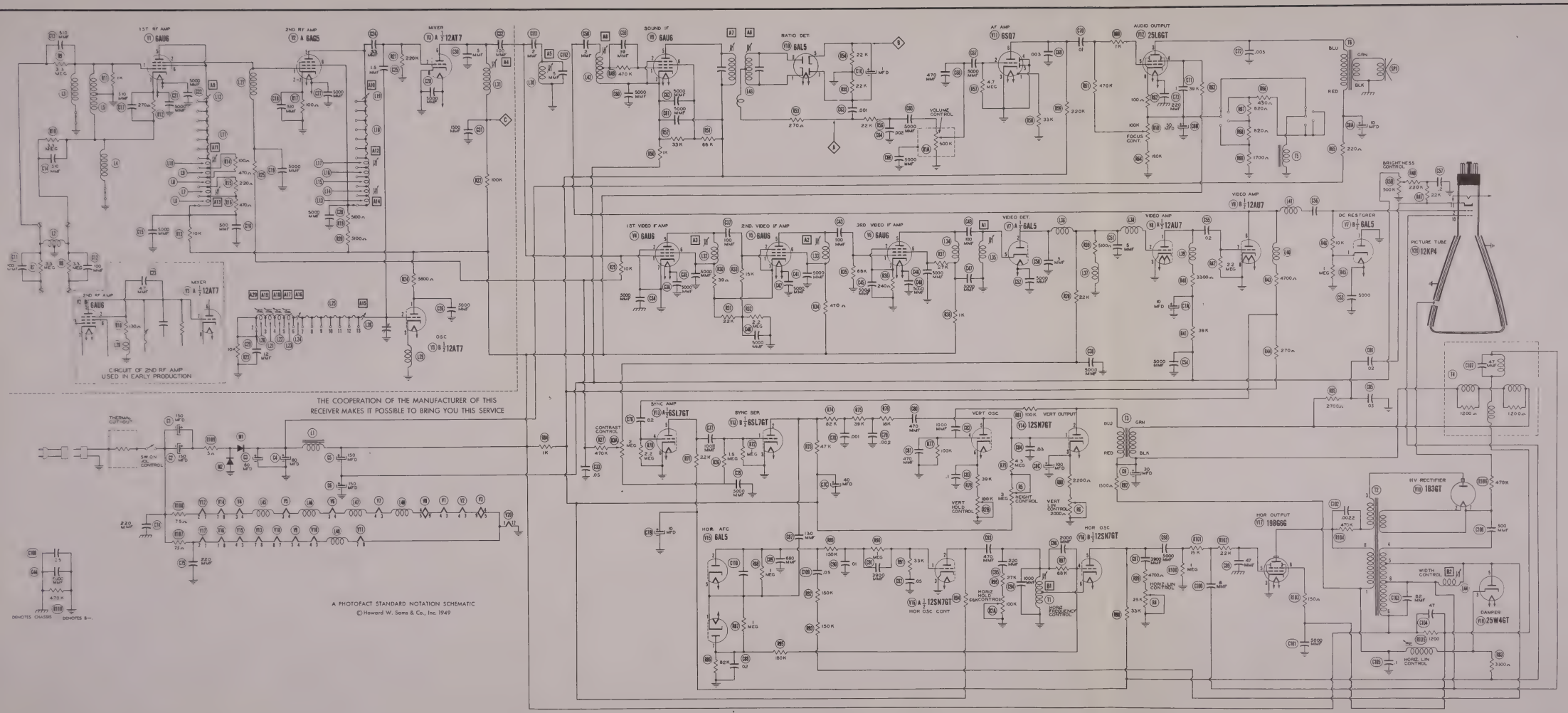
1ST RF AMP
6AU6
2ND RF AMP
6AG5
MIXER
12AT7
SOUND IF
6AU6
RATIO DET.
6AL5
AF AMP
6SQ7
AUDIO OUTPUT
25L6GT
VOLUME CONTROL
FOCUS CONT.
BRIGHTNESS CONTROL
PICTURE TUBE
12KP4
1ST. VIDEO F AMP
6AU6
2ND. VIDEO IF AMP
6AU6
3RD VIDEO IF AMP
6AU6
VIDEO DET.
6AL5
VIDEO AMP
12AU7
VIDEO AMP
12AU7
DC RESTORER
6AL5
2ND RF AMP
6AU6
MIXER
12AT7
OSC
12AT7
CIRCUIT OF 2ND RF AMP USED IN EARLY PRODUCTION
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THERMAL CUT-OUT
S.R. ON CONTROL
SYNC AMP
6SL7GT
SYNC SEP.
6SL7GT
CONTRAST CONTROL
VERT. OSC.
VERT. OUTPUT
12SN7GT
VERT HOLD CONTROL
HEIGHT CONTROL
VERT LIN CONTROL
HOR. AFC
6AL5
HOR OSC CONT.
12SN7GT
HOR OSC
12SN7GT
HORIZ HOLD & FAC CONTROL
FINE FREQUENCY CONTROL
HOR OUTPUT
19BGG
HV RECTIFIER
1B3GT
HORIZ LIN CONTROL
WIDTH CONTROL
DAMPER
25W4GT
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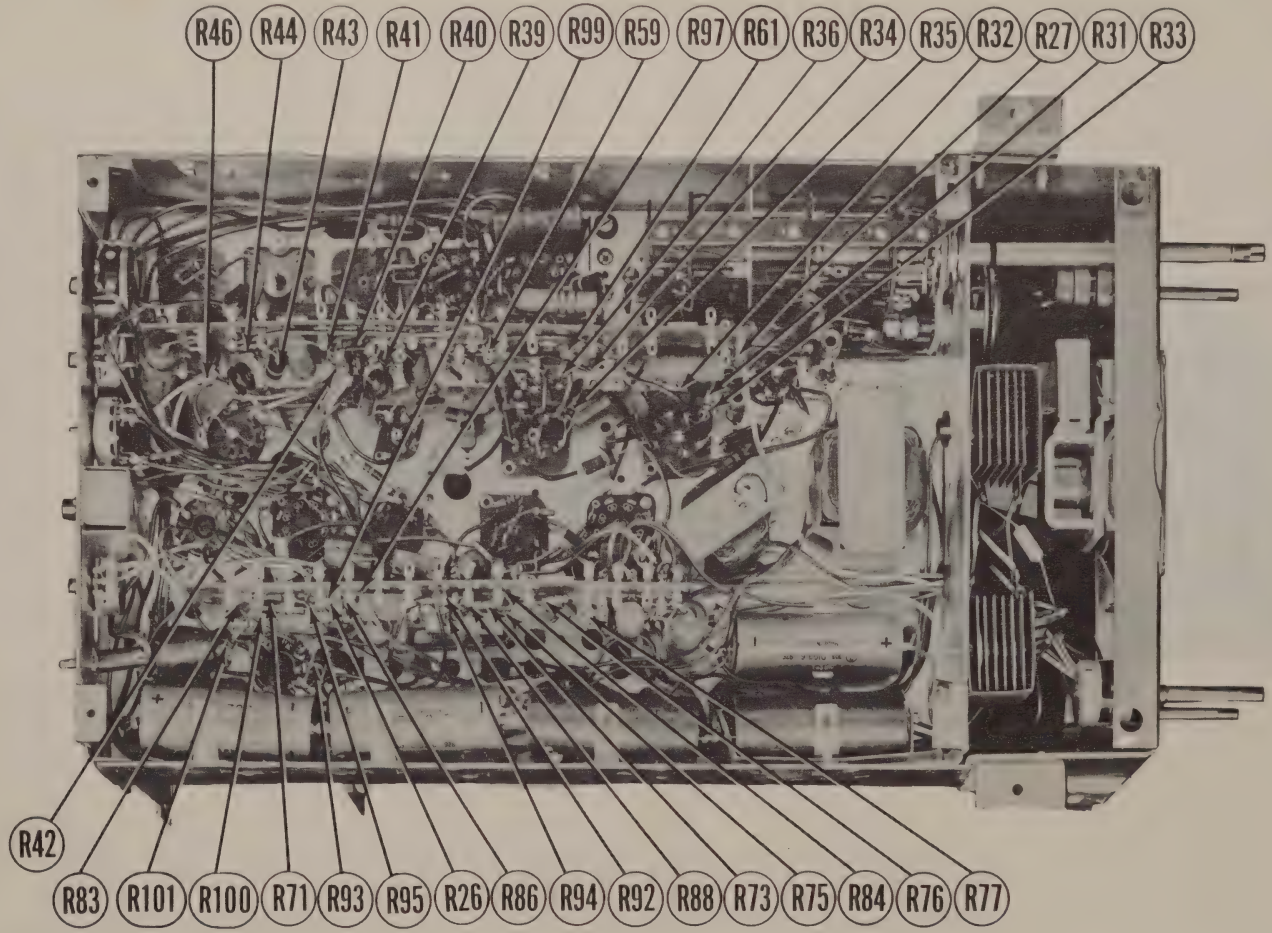
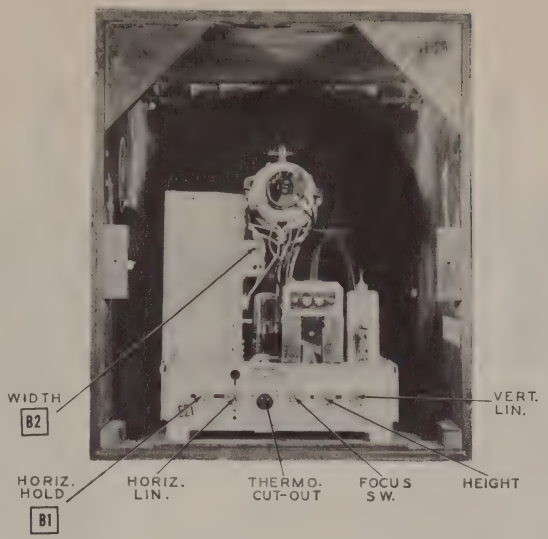
DENOTES CHASSIS
DENOTES B—

FINE TUNING CORD STRINGING



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR FREQUENCY ADJUSTMENT

Turn the set on, tune in a TV station, and turn the vertical hold control to synchronize the picture vertically.

Turn the horizontal hold control to the mid-point of its range.

Adjust the horizontal frequency adjustment B1 to the center of the range over which the picture synchronizes normally.

On some sets there may be an additional slug adjustment in the grid circuit of the horizontal oscillator. This second adjustment is a flywheel coil added to the sets using a blocking oscillator in the horizontal oscillator circuit. Adjustment for these receivers is as follows:

1. Turn the screw on the flywheel coil all the way in.
2. Short circuit the flywheel coil.
3. Turn the set on and tune in a TV station. Set the contrast control to its normal setting.
4. Turn the horizontal hold control maximum clockwise, the picture may or may not tear out of sync.
5. Turn the core of the blocking oscillator transformer (B1) to minimum inductance. On some models this setting is all the way out, on other models minimum inductance may be all the way in.
6. Slowly adjust B1 towards maximum inductance until the blanking bar appears on the left edge of the raster just before the picture tears out of sync.
7. Turn the horizontal hold control counter-clockwise until the picture JUST pulls into sync.
8. Remove the short across the flywheel coil. Without touching any other adjustment, slowly turn the adjusting screw on the flywheel coil out until the picture JUST drops into sync.

The horizontal oscillator is now properly adjusted.

HORIZONTAL LINEARITY ADJUSTMENT

Proper adjustment of the linearity controls can best be made while receiving a test pattern from a TV station.

While receiving a station, turn the vertical hold control to synchronize the picture vertically.

Adjust the width adjustment B2, so the picture fills the mask horizontally.

Turn the horizontal linearity control until the picture is symmetrical from left to right.

Center the picture in the mask by use of the centering adjustment outlined below.

CENTERING ADJUSTMENT

The centering adjustment consists of a circular magnet mounted on the focus and deflection assembly, between the focus coil and the deflection yoke.

Centering is accomplished by moving the magnet forward or backward and rotating it until the picture is properly centered.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF) CONT.

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	G.E. PART No.	MEISSNER PART No.	
L25	Osc.Coil	0Ω				Channels #7-12, Part of tuner
L26	Osc.Coil	0Ω		RLC-087		Channel #13
L27	RF Choke	2.1Ω		RLF-024		
L28	RF Choke			RLI-032		Used only in models using type 6AU6 as V2.
L29	Osc.Cath. Choke	1.5Ω		RLI-032		8.2 microhenries
L30	Trap Coil					Used on chassis marked with "V" on front apron.
L31	1st Video IF	.1Ω		RLP-010		
L32	2nd Video IF	.1Ω		RLP-011		
L33	3rd Video IF	.1Ω		RLP-012		
L34	3rd Video IF Plate	4Ω				76 microhenries
L35	4th Video IF	.1Ω		RLP-013		
L36	Peaking	2.5Ω		RLI-063		2 microhenries
L37	Peaking	6.9Ω		RLI-038		165 microhenries
L38	Peaking	6.9Ω		RLI-038		165 microhenries
L39	Peaking	9Ω		RLI-068		265 microhenries
L40	Peaking	6.9Ω		RLI-038		165 microhenries
L41	Peaking	9Ω		RLI-068		265 microhenries
L42	Sound IF	7Ω		RLI-069		
L43	Ratio Det. Trans.	4Ω	.5Ω	RTD-008		
L44	Width Cont.	5Ω		RLD-014		
L45	Fil. Choke	2.5Ω		RLI-063		2 microhenries
L46	Fil. Choke	2.5Ω				
L47	Fil. Choke	2.5Ω		RLI-063		2 microhenries
L48	Fil. Choke	2.5Ω				
L49	Fil. Choke	2.5Ω		RLI-063		2 microhenries

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	G. E. PART No.	SYLVANIA PART No.		
M1	.203A	RER-004			
M2	.203A	RER-004			

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M3A	RF Tuner	RJX-028	Models 805, 806, 807 Complete
B	RF Tuner	RJX-027	Model 809 Complete
M4	Ion Trap	RET-002	Model 805
M5	Thermal Cutout	RSR-001	
	Cabinet	RAC-061	Model 805
	Cabinet	RAV-081	Model 806
	Cabinet	RAV-079	Model 807
	Cabinet Front	RAC-062	Model 805
	Cabinet Back	RAB-089	Model 806 and 807
	Cabinet Back	RAB-090	Model 809
	Cabinet	RAV-080	Model 809 Early production receivers using 6 3/8 x 8 1/2 inch picture opening.
	Cabinet	RAV-085	Model 809, late production receivers using 7 1/8 x 9 1/2 inch picture opening.
	Knob	RDK-159	Off-volume, Hor. hold, Models 805, 806, 807
	Knob	RDK-160	Focus, Vert. hold and contrast, Models 805, 806,807
	Knob	RDK-161	Tuning,Models 805, 806, 807
	Knob	RDK-162	Brightness, Models 805,806, 807
	Knob	RDK-163	Channel Selector, models 805, 806, 807
	Knob	RDK-168	Off-volume, Hor. hold, Model 809
	Knob	RDK-169	Focus, Vert. hold, Contrast, Model 809
	Knob	RDK-170	Tuning, Model 809
	Knob	RDK-171	Brightness, Model 809
	Knob	RDK-172	Channel selector, Model 809
	Safety Glass	RDW-014	Models 806, 807
	Safety Glass	RDW-015	Model 805
	Safety Glass	RDW-016	Model 809, RAV-080 Cabinet.
	Safety Glass	RDW-020	Model 809, RAV-085 Cabinet.

RIPTIONS (Continued)

CONT.)

IDENTIFICATION CODES
RF Cathode
RF Plate
RF Plate Coil Shunt
RF Plate Coil Shunt
RF Plate Coil Shunt
2nd RF Cathode
2nd RF Supp. Grid See Note 1
2nd RF Decoupling
2nd RF Decoupling
Conv. Grid
Conv. Plate Decoupling
Osc. Grid
Osc. Plate
Bias Network
Voltage Divider
Bias Network
Bias Network
1st Video IF Grid
1st Video IF Decoupling
Voltage Divider
2nd Video IF Grid
2nd Video IF Grid
2nd Video IF Decoupling
3rd Video IF Grid
3rd Video IF Cathode
3rd Video IF Screen
3rd Video IF Decoupling
Video Det. Diode Load
Video Amp. Plate
Low Pass Filter
Video Amp. Grid
Video Amp. Plate
Video Amp. Plate
DC Rest. Diode Load
Picture Tube Grid
Voltage Divider
Voltage Divider
Sound IF Grid
Sound IF Cathode
Sound IF Screen
Voltage Divider
Balancing
Ratio Det. Diode Load
Ratio Det. Diode Load
De-emphasis
AF Grid
Isolation
AF Plate
Parasitic Supp.
Output Grid
Output Cathode
Output Screen
Voltage Divider
Filter
Focus Coil Shunt
Focus Coil Shunt
Focus Coil Shunt
Focus Coil Shunt Wire Wound
Sync. Amp. Grid
Sync. Amp. Plate
Sync. Clipper Grid
Sync. Clipper Plate
Integrator
Integrator
Integrator
Vert. MV Grid
Vert. MV Cathode
Vert. MV Plate
Vert. Output Cathode
Feedback
Vert. Output Plate Decoupling
Vert. Output Plate Decoupling
Voltage Divider
Differentiator
Feedback Network
Horiz. AFC Diode Load
Horiz. AFC Diode Load
Horiz. AFC Filter Network
Horiz. AFC Grid
Horiz. AFC Filter Network
Feedback Network
Feedback Network
Horiz. AFC Plate
Voltage Divider See Note 2
Horiz. Peaking
Horiz. Osc. Grid See Note 3
Horiz. Osc. Plate
Horiz. Peaking
Horiz. Output Grid
Horiz. Output Grid
Parasitic Supp. See Note 4
Horiz. Output Screen
Current Limiting
Horiz. Centering
HV Filter
Filament Dropping Wire Wound
Filament Dropping Wire Wound
Surge Limiter Wire Wound
Isolation

e as V2.
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TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA G. E. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T1A	102Ω Tap. ④ 40Ω		RLC-091				Hor.Osc.Coil
B	34Ω	85Ω	RLI-067 ■				Hor.Block Osc.Trans.
T2A	40Ω	SEC. 1 37.5Ω	RTO-071				Hor.Output Trans.
		SEC. 2 24Ω Tap. ⑥ 18Ω & 12Ω					
		SEC. 3 0Ω					
B			RTO-065 ■				Hor.Output Trans.
C			RTO-068 ■				Hor.Output Trans.
T3	1200Ω	7.5Ω	RTO-064	A-8113 ‡‡		TSO-5	Vert.Output Trans.
T4A	16Ω		RLO-13				Hor.Deflection Coil
B	28Ω						Vert.Deflection Coil
T4A			RLO-10 ■				Hor.Deflection Coil
B							Vert.Deflection Coil
T5A	850Ω		RLF-028				Focus Coil
B			RLF-025 ■				Focus Coil
C			RLF-026 ■				Focus Coil

■ Used in early productions.
‡‡ Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA G. E. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T6A	2700Ω	3.4Ω	200Ω	.5Ω		A-3876**	A-2928**	RO-2**	**Bend mouting tabs down and mount on original bracket.
B					RTO-062 ■				■ Used in early production.
C					RTL-066 ■				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA G. E. PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-1131††		†† Remount output transformer.
SP1A	PM	3.4Ω		MOD.P4-X	4A1 ††	■ Used in early productions.
B	80Ω		ROP-019 ■			
C	80Ω		ROP-018 ■			
	CONE DIA.	V. C. DIA.				
SP2A	3 7/8"	9/16"				
B						
C						

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ↺)	REPLACEMENT DATA G. E. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.170A	55Ω	1.2Henries	RTL-066	C-2325 ‡‡	C-2974 ‡‡	TR-4200 ‡‡	‡‡ Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA G. E. PART No.	MEISSNER PART No.	NOTES
L2	Interference Trap	0Ω				Late production.
L3	RF Coil	0Ω		RLI-083		
L4	RF Coil	0Ω		RLI-083		
L5	Ant. Trans.	0Ω		RLF-023		
L6	RF Coil	0Ω		RLI-070		Channel #2
L7	RF Coil	0Ω		RLI-071		Channel #3
L8	RF Coil	0Ω		RLI-072		Channel #4
L9	RF Coil	0Ω		RLI-073		Channel #5
L10	RF Coil	0Ω		RLI-074		Channel #6
R11	RF Coil	0Ω				Channel #7-12 Part of tuner.
L12	RF Coil	0Ω		RLI-075		Channel #13
L13	RF Coil	0Ω		RLI-076		Channel #2
L14	RF Coil	0Ω		RLI-077		Channel #3
L15	RF Coil	0Ω		RLI-078		Channel #4
L16	RF Coil	0Ω		RLI-079		Channel #5
L17	RF Coil	0Ω		RLI-080		Channel #6
L18	RF Coil	0Ω				Channel #7-12, Part of tuner
L19	RF Coil	0Ω		RLI-081		Channel #13
L20	Osc.Coil	0Ω		RLC-081		Channel #2
L21	Osc.Coil	0Ω		RLC-082		Channel #3
L22	Osc.Coil	0Ω		RLC-083		Channel #4
L23	Osc.Coil	0Ω		RLC-084		Channel #5
L24	Osc.Coil	0Ω		RLI-074		Channel #6

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C56	.1	400	UCC-030	P488-1	GT4P1		TM-1	Video Coupling
C57	.2	200	UCC-014	P488-22	GT4P2		TC-2	Pic. Tube Cath. Dec.
C58	.2		RCW-3022					S. IF Coupling
C59	39	500	UCU-1018	1468-00004	5W5Q4	GP1K-39	1FM-44	S. IF Coupling
C60	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	RF Bypass
C61	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	S. IF Decoupling
C62	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	S. IF Screen Bypass
C63	.001	600	UCC-620	P688-001	GT6D1	GP2L-001	TM-21	Diode Load Cap.
C64	.002	600	UCC-621	P688-002	GT6D2	GP2M-002	TM-22	De-emphasis
C65	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Audio Coupling
C66	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Vol. Cont. Isolation
C67	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Audio Coupling
C68	470	500	UCU-1044	1468-0005	5W5T5	GP2K-500	1FM-35	RF Bypass
C69	.003	600	UCC-037	P688-003	GT6D3	GP2M-003	TM-23	AF Plate Bypass
C70	.01	600	UCC-630	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C71	.1	400	UCC-030	P488-1	GT4P1		TM-1	Output Screen Byp.
C72	.005	1000	RCC-059	P1088-005	GT16D5		MB-25	Output Plate Bypass
C73	220	500	UCU-1036	1468-00025	5W5T25	GP2K-220	1FM-325	Filament Bypass
C74	220	500	UCU-1036	1468-00025	5W5T25	GP2K-220	1FM-325	Filament Bypass
C75	220	500	UCU-1036	1468-00025	5W5T25	GP2K-220	1FM-325	Filament Bypass
C76	.02	400	UCC-026	P488-02	GT4S2		TM-12	Sync. Coupling
C77	1000	500	UCU-052	1468-001	1W5D1	GP2L-001	1FM-21	Sync. Coupling
C78	.001	600	UCC-620	P688-001	GT6D1	GP2L-001	TM-21	Integrator Net.
C79	.002	600	UCC-621	P688-002	GT6D2	GP2M-002	TM-22	Integrator Net.
C80	470	500	UCU-1044	1468-0005	5W5T5	GP2K-470	1FM-35	Vert. Sync. Coupling
C81	470	500	UCU-1044	1468-0005	5W5T5	GP2K-470	1FM-35	Vert. MV Grid
C82	1000	500	UCU-052	1468-001	1W5D1	GP2L-001	1FM-21	Vert. MV Feedback
C83	.1	200	UCC-013	P288-1	GT2P1		TM-1	Vert. MV Cath. Bypass
C84	.03	600		P688-03	GT6S3		TM-13	Vert. Discharge
C85	.05	400	UCC-028	P488-05	GT4S5		TM-15	Voltage Divider
C86	.02	400	UCC-026	P488-02	GT4S2		TM-12	Vert. Sweep Coupling
C87	130	500		1468-0001	5W5T1	GP2K-120	1FM-31	Hor. Sync. Coupling ♦
C88	.02	200	UCC-009	P488-02	GT2S2		TM-12	AFC Filter
C89	680	500	UCU-048		1W5T7	GP2K-680	1FM-37	AFC Filter
C90	.01	600	UCC-630	P688-01	GT6S1	GP2-335-01	TM-11	AFC Filter
C91	3900	500	UCU-2066	1467-004	1D5D4		1FM-24	Hor. Sync. Coupling
C92	.05	200	UCC-045	P288-05	GT2S5		TM-15	AFC Filter
C93	470	500	UCU-1044	1468-0005	5W5T5	GP2K-470	1FM-35	AFC Coupling
C94	1000	500	UCU-052	1467-001	1W5D1	GP2L-001	1FM-21	Fixed Trimmer
C95	220	500	UCU-1036			GP2K-220		Peaking †
C96	2000	500	UCU-2059	1467-002	1W5D2	GP2M-002	1FM-22	Hor. Osc. Grid
C97	3900	500	UCU-2066	1467-004	1D5D4		1FM-24	Hor. Discharge ‡
C98	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Hor. Sweep Coupling
C99	47	500		1468-00005	5W5Q5	GP1K-47	1FM-45	Hor. Output Grid Byp. $
C100	6	800	RCU-286					Hor. Feedback
C101	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Output Screen Bypass
C102	.0022	1000		P1088-0022	GT16D2		MB-22	Hor. Sweep Coupling
C103	82	1500	RCN-024					Fixed Trimmer
C104	.47	200	RCC-016	P288-47	GT2P5		TC-5	Hor. Sweep Coupling
C105	.1	600		P688-1	GT6P1		TM-1	Damper Filter
C106	500	20000	RCN-023					HV Filter
C107	47	500		1469-00005	5R5Q5	NPOM-50	MS-45	Fixed Trimmer
C108	.05	600	UCC-635	P688-05	GT6S5		TM-15	Line Isolation
C109	.05	600	UCC-635	P688-05	GT6S5		TM-15	Hor. Feedback
C110	100	500	UCU-028	1468-001	5W5T1	GP1K-100	1FM-31	AFC Filter †
C111	2							IF Coupling †
C112	5			1469-000005	5R5V5	NPOK-5	MS-55	Fixed Trimmer

* Used only in sets that use a type 6AG5 tube for V2.
† Not used in all models.
‡ Some models use 2000MMF in this application.
$ Some models use 22MMF in this application.
♦ Some models use 82MMF in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G. E. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	500KΩ	½	RRC-099	B13-133 *	K68J881-2	Volume control, rear (Dual Concentric)
B	100KΩ	½		B11-128 *		Focus control, front
C	Shaft					
	End			E202 *		Attach per instructions in "Concentrikit".
D	Switch			76-1 *		Attach per instructions in "Concentrikit".
R2A	100KΩ	½	RRC-098	B11-128 *	K68J880-2	Horiz. hold control, rear (Dual Concentric)
B	100KΩ	½		B11-128 *		Vert. hold control, front
C	Shaft					
	End			E202 *		Attach per instructions in "Concentrikit".
R3A	2 Meg.	½	RRC-109	B11-139 *	K69J604-2	Contrast control, front (Dual Concentric)
B	500KΩ	½		B13-133 *		Brightness control, rear
C	Shaft					
	End			E202 *		Attach per instructions in "Concentrikit".
R4A	25KΩ	½	RRC-108	Q11-120	AM-40-S	Horiz. linearity control
B	Shaft		Not Req.	SQ	KSS-3 #	Attach to R4A per instructions
R5A	3 Meg.	½	RRC-096	Q11-140		Height control
B	Shaft		Not Req.	SQ		Attach to R5A per instructions
R6	20002	2	RRC-095	W-2000 #	43-2000 #	Vert. linearity control, (Wire Wound)

File shaft to duplicate original.
* Additional parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G. E. PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R7	3.3 Meg.	½	URD-133		Ant. Loading
R8	3.3 Meg.	½	URD-133		Ant. Loading
R9	3.3 Meg.	½	URD-133		Ant. Loading
R10	3.3 Meg.	½	URD-133		Ant. Loading
R11	10002	½	URD-049	BTS-1000	RF Grid

RESISTO

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G. E. PART No.	IRC PART No
R12	270Ω	½	URD-035	
R13	10KΩ	1	URE-073	
R14	100Ω	½	URD-025	
R15	220Ω	½	URD-033	
R16	470Ω	½	URD-041	
R17	100Ω	½	URD-025	
R18	130Ω	½	URD-1028	
R19	5100Ω 5%	1	URE-1066	
R20	5100Ω 5%	1	URE-1066	
R21	220KΩ	½	URD-105	
R22	100KΩ 5%	1	URE-1097	
R23	10KΩ 5%	½	URD-1073	
R24	5600Ω	1	URE-067	
R25	470Ω	½	URD-041	
R26	1.5Meg.20%	½		BTS-1.5 M
R27	470KΩ 20%	½	URD-113	BTS-470K
R28	22KΩ	½	URD-081	BTS-22K
R29	10KΩ 5%	½	URD-1073	
R30	39Ω	½	URD-015	
R31	22KΩ	½	URD-081	BTS-22K
R32	2.2 Meg.	½	URD-129	BTS-2.2 M
R33	15KΩ	½	URD-077	BTS-15K
R34	470Ω	½	URD-041	
R35	68KΩ	½	URD-093	
R36	2402 5%	½	URD-1034	
R37	27KΩ	½	URD-083	BTS-27K
R38	1000Ω 20%	½	URD-049	BTS-1000
R39	5100Ω 5%	½	URD-1066	
R40	3300Ω	½	URD-061	BTS-3300
R41	39KΩ	½	URD-087	BTS-39K
R42	2.2 Meg.	½	URD-129	BTS-2.2 M
R43	4700Ω	2	URF-065	BT-2-4700
R44	270Ω	½	URD-035	BW-½-270
R45	1 Meg.	½	URD-121	BTS-1 Meg
R46	10KΩ	½	URD-073	BTS-10K
R47	22KΩ	½	URD-081	BTS-22K
R48	220KΩ	½	URD-105	BTS-220K
R49	470KΩ	½	URD-113	BTS-470K
R50	1000Ω 20%	½	URD-049	BTS-1000
R51	68KΩ	½	URD-093	BTS-68K
R52	33KΩ	½	URD-085	BTS-33K
R53	270Ω	½	URD-035	BW-½-270
R54	22KΩ 5%	½	URD-1081	BTS-22K-5%
R55	22KΩ 5%	½	URD-1081	BTS-22K-5%
R56	22KΩ	½	URD-081	BTS-22K
R57	4.7 Meg.	½	URD-137	BTS-4.7 M
R58	33KΩ	½	URD-085	BTS-33K
R59	220KΩ	½	URD-105	BTS-220K
R60	1000Ω 20%	½	URD-049	
R61	470KΩ	½	URD-113	BTS-470K
R62	100Ω	½	URD-025	BW-½-100
R63	39KΩ	1		BTA-39K
R64	180KΩ	½	URD-103	BTS-180K
R65	2202 20%	1	URE-1033	BW-1-220
R66	4302 5%	1	URE-1040	
R67	8202 5%	1	URE-1047	BTA-820-5%
R68	8202 5%	1	URE-1047	BTA-820-5%
R69	170Ω	5		AB-1750
R70	2.2 Meg.	½	URD-129	BTS-2.2 M
R71	22KΩ	1		BTA-22K
R72	1 Meg.	½	URD-121	BTS-1 Meg
R73	47KΩ	½	URD-089	BTS-47K
R74	82KΩ	½		BTS-82K
R75	39KΩ	½	URD-087	BTS-39K
R76	18KΩ	½	URD-079	BTS-18K
R77	100KΩ 5%	½	URD-1097	BTS-100K-
R78	39KΩ	½	URD-087	BTS-39K
R79	4.3 Meg.5%	½	URD-1136	BTS-4.7 M 5
R80	2200Ω 5%	1		BTA-2200-
R81	100KΩ 5%	½	URD-1097	BTS-100K-
R82	1500Ω 20%	1	URE-053	BTA-1500
R83	3300Ω	1		BTA-3300
R84	1000Ω 20%	1	URE-049	BTA-1000
R85	2700Ω	½	URD-069	BTS-2700
R86	82KΩ	½		BTS-82K
R87	1 Meg.	½	URD-121	BTS-1 Meg
R88	1 Meg.	½	URD-121	BTS-1 Meg
R89	150KΩ	½	URD-101	BTS-150K
R90	1 Meg.	½	URD-121	BTS-1 Meg
R91	33KΩ	½	URD-085	BTS-33K
R92	150KΩ	1	URE-1101	BTA-150K
R93	150KΩ	1	URE-1101	BTA-150K
R94	68KΩ	1		BTA-68K
R95	180KΩ	½	URD-103	BTS-180K
R96	27KΩ	½	URD-083	BTS-27K
R97	68KΩ	½	URD-093	BTS-68K
R98	33KΩ	1		BTA-33K
R99	4700Ω	½	URD-065	BTS-4700
R100	1 Meg.	½	URD-121	BTS-1 Meg
R101	15KΩ	½	URD-077	BTS-15K
R102	22KΩ	½	URD-081	
R103	150Ω 20%	½	URD-029	BTS-150
R104	470KΩ 20%	½	URD-113	
R105	1200Ω	½		BTS-1200
R106	470KΩ	1		
R107	75Ω	10	RRW-041	AB-75
R108	75Ω	10	RRW-041	AB-75
R109	5Ω	4	RRW-040	
R110	470KΩ 20%	½	URD-113	BTS-470K

Note 1. Used only in models using type 6AU
Note 2. Some models use 270KΩ resistor in
Note 3. Some models use 82KΩ resistor in t
Note 4. Some models use 330Ω resistor in t

PARTS LIST AND DESCRIPTIONS

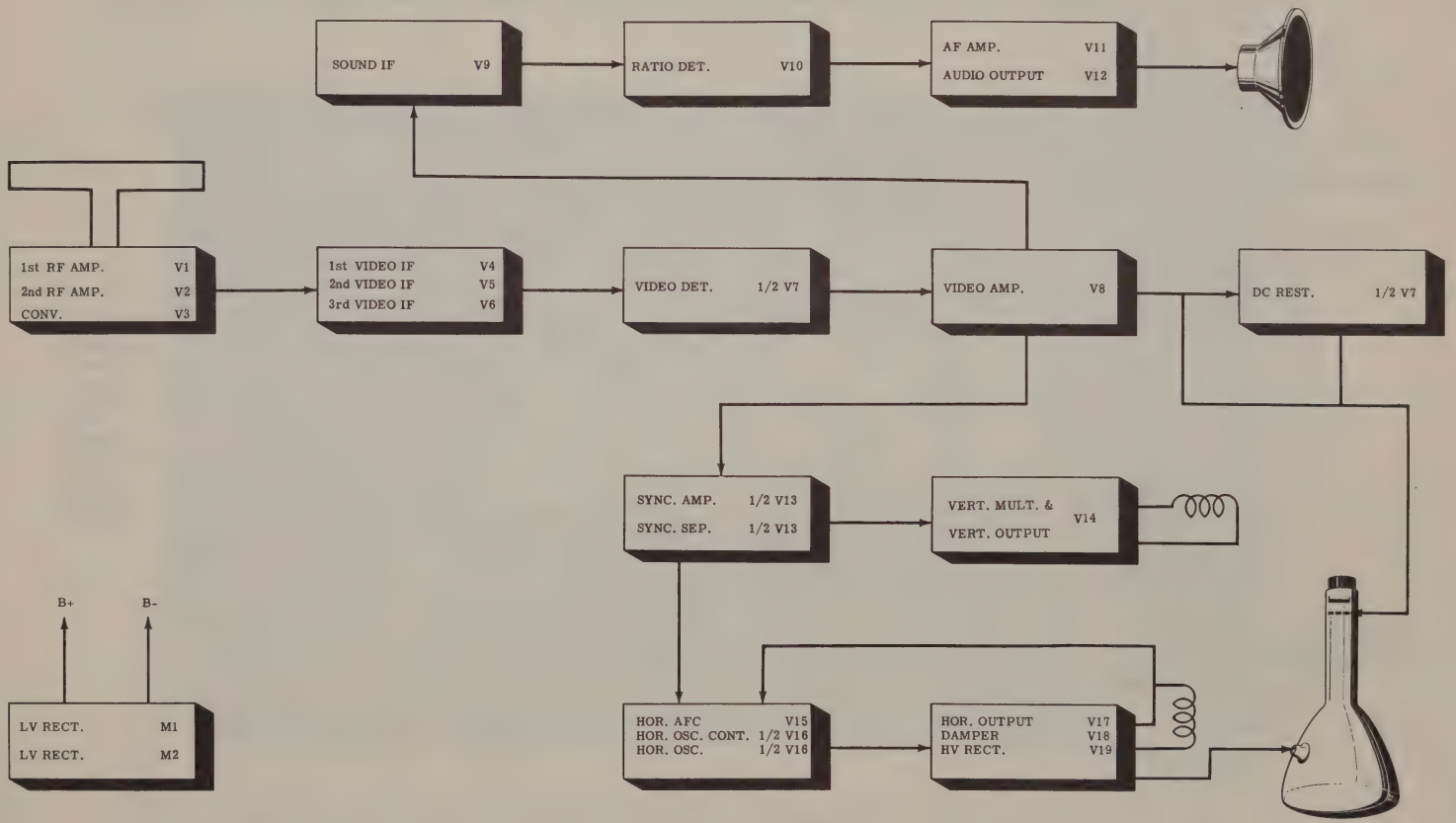
TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		G. E. PART No.	STANDARD REPLACEMENT		
V1	1st RF Amp.	6AU6	6AU6	7BK	
V2A	2nd RF Amp.	6AG5	6AG5	7BD	Late Productions
B	2nd RF Amp.	6AU6	6AU6	7BK	Early Productions
V3	Converter	12AT7	12AT7	9A	
V4	1st Video IF	6AU6	6AU6	7BK	
V5	2nd Video IF	6AU6	6AU6	7BK	
V6	3rd Video IF	6AU6	6AU6	7BK	
V7	Video Det.-DC Restorer	6AL5	6AL5	6BT	
V8	Video Amp.	12AU7	12AU7	9A	
V9	Sound IF	6AU6	6AU6	7BK	
V10	Ratio Det.	6AL5	6AL5	6BT	
V11	AF Amp.	6SQ7	6SQ7	8Q	
V12	Audio Output	25L6GT	25L6GT	7AC	
V13	Sync. Amp.-Sync. Sep.	6SL7GT	6SL7GT	8BD	
V14	Vertical Multi-vibrator-Vert. Output	12SN7GT	12SN7GT	8BD	
V15	Hor. AFC	6AL5	6AL5	6BT	
V16	Hor. Osc. Cont.-Hor. Osc.	12SN7GT	12SN7GT	8BD	
V17	Hor. Output	19BG6G	19BG6G	5BT	
V18	Damper	25W4GT	25W4GT		
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20A	Picture Tube	12KP4		12D	
B	Picture Tube	10BP4	10BP4	12D	
C	Picture Tube	10FP4		12D	

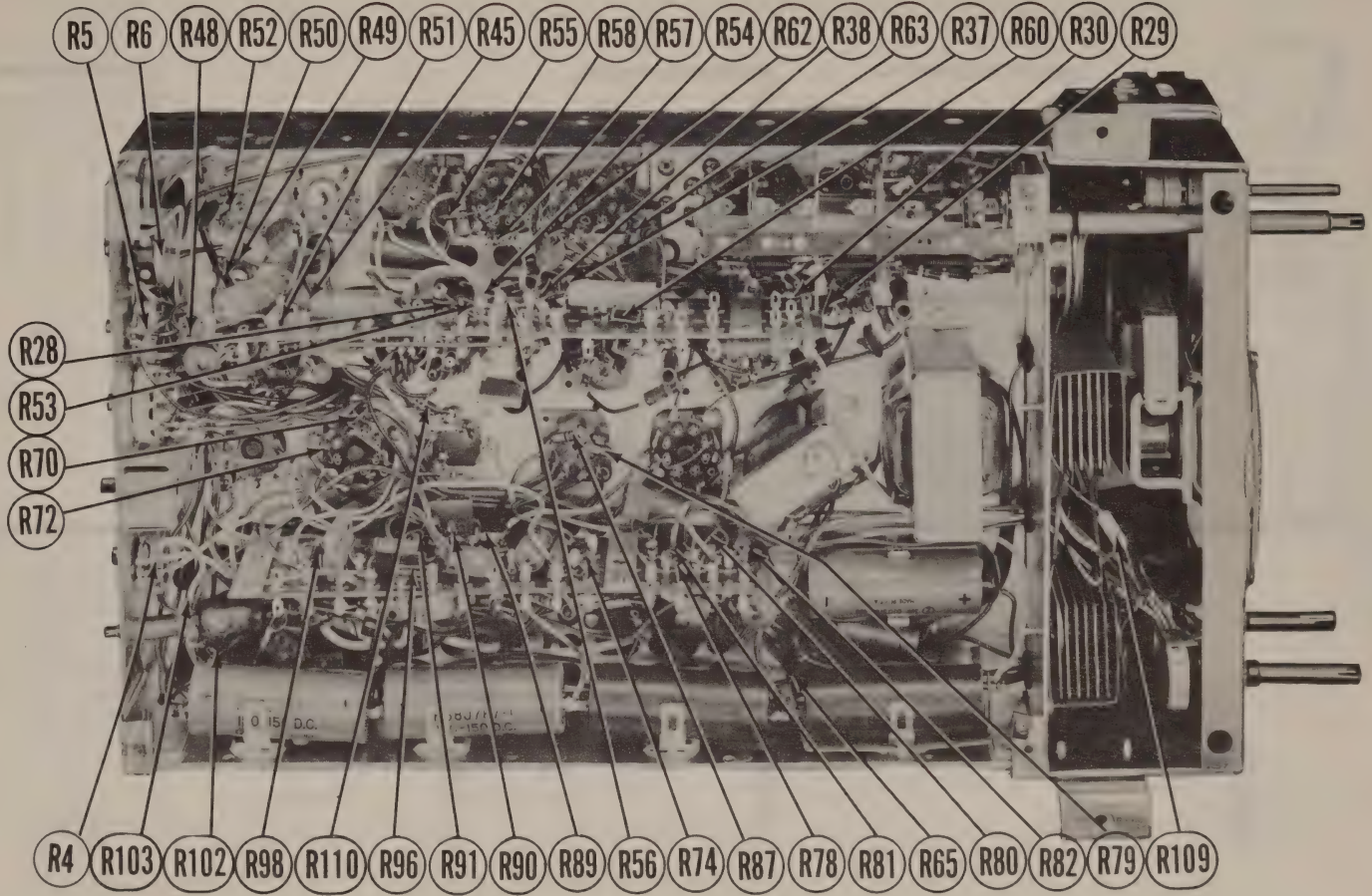
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

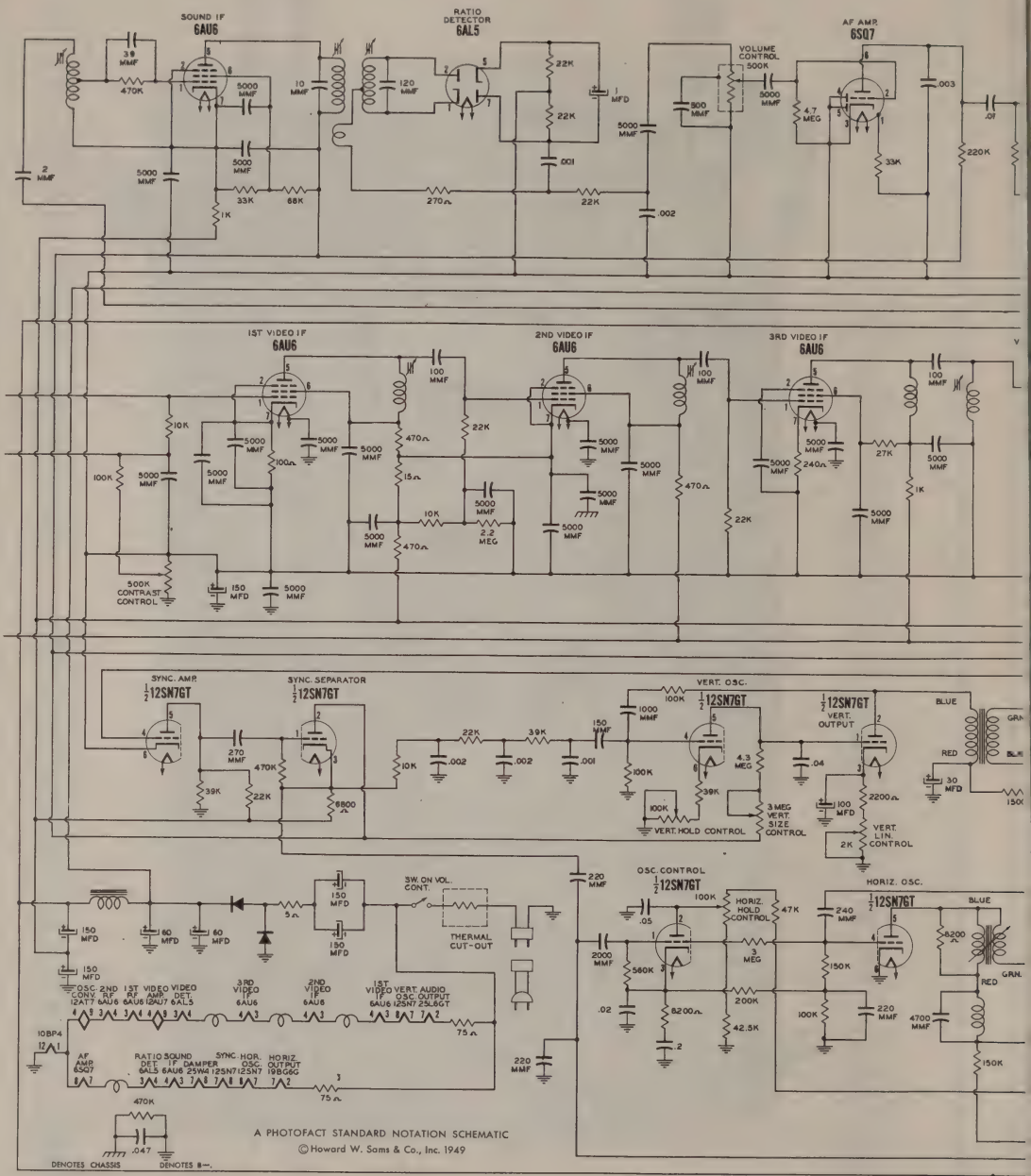
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1	150	150	RCE-091	PRSH150/150	BRE15015		TVA-29	Voltage Doubler Cap.
C2	150	150	RCE-091	PRSH150/150	BRE15015		TVA-29	Voltage Doubler Cap.
C3	60	350	RCE-094	PRSH350/60	BRE6035			Filter
C4	60	350	RCE-094	PRSH350/60	BRE6035			Filter
C5	150	150	RCE-091	PRSH150/150	BRE15015		TVA-29	Filter
C6	150	150	RCE-091	PRSH150/150	BRE15015		TVA-29	Filter
C7A	10	150		AFH2I8G2D	UP7CJ			▲ Low Pass Filter
B	10	400			1048			◓ Decoupling
C	40	300						■ Decoupling
C8A	10	350	RCE-089	AFH2H10D20B	UP6CJ389			■ Output Plate Dec.
B	50	150						▲ Output Cath. Bypass
C	100	50						Vert. Output Cath. Byp.
C9	30	450	RCE-092	PRSH450/30	BR3045		TVA-23	Vert. Output Dec.
C10	1	50	RCE-090		BR145		TVA-11	Stabilizing Cap.
C11	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	Ant. Coupling
C12	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	Ant. Coupling
C13	510		RCW-3020			GP2K-500		RF Coupling
C14	510		RCW-3020			GP2K-500		RF Coupling
C15	5000		RCW-3014			811-005	29C1	RF Plate Decoupling
C16	500		RCW-3021			323-500		RF Plate Decoupling
C17	510		RCW-3020			GP2K-500		RF Cath. Bypass
C18	510		RCW-3020			GP2K-500		2nd RF Cath. Bypass
C19	5000		RCW-3014			811-005	29C1	AGC Filter
C20	5000		RCW-3014			811-005	29C1	2nd RF Decoupling
C21	5000		RCW-3014			811-005	29C1	1st RF Fil. Bypass
C22	5000		RCW-3014			811-005	29C1	2nd RF Fil. Bypass
C23	47		RCW-3023			GP1K-47		RF Coupling *
C24	3.3		RCN-017			NPOK-3.3		RF Coupling
C25	1.5		RCW-1045			NPOK-1.5		Osc. Coupling
C26	5000		RCW-3014			811-005	29C1	Osc. Plate Dec.
C27	5000		RCW-3014			811-005	29C1	Osc. Fil. Bypass
C28	5000		RCW-3014			811-005	29C1	Osc. Fil. Bypass
C29	12		RCW-2006			GP1K-12		Osc. Feedback
C30	5		RCW-2035			NPOK-5		Fixed Trimmer
C31	1500					GP2L-0015		Mixer Plate Dec.
C32	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C33	.05	200	UCC-045	P288-05	GT2S5		TM-15	AGC Filter
C34	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	RF Bypass
C35	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	1st V. IF Dec.
C36	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	1st V. IF Fil. Bypass
C37	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C38	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	AGC Filter
C39	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	AGC Filter
C40	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	2nd V. IF Grid Cap.
C41	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	2nd V. IF Decoupling
C42	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	2nd V. IF Fil. Bypass
C43	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C44	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	RF Bypass
C45	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	3rd V. IF Cath. Bypass
C46	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	3rd V. IF Screen Bypass
C47	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	3rd V. IF Decoupling
C48	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	3rd V. IF Fil. Bypass
C49	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C50	5		RCW-2035	1468-000005	5W5V5	NPOK-5	MS-55	V. Diode Filter
C51	5		RCW-2035	1468-000005	5W5V5	NPOK-5	MS-55	V. Diode Filter
C52	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	V. Det. Fil. Bypass †
C53	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	V. Det. Fil. Bypass
C54	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	RF Bypass
C55	.02	400	UCC-026	P488-02	GT4S2		TM-12	Video Coupling



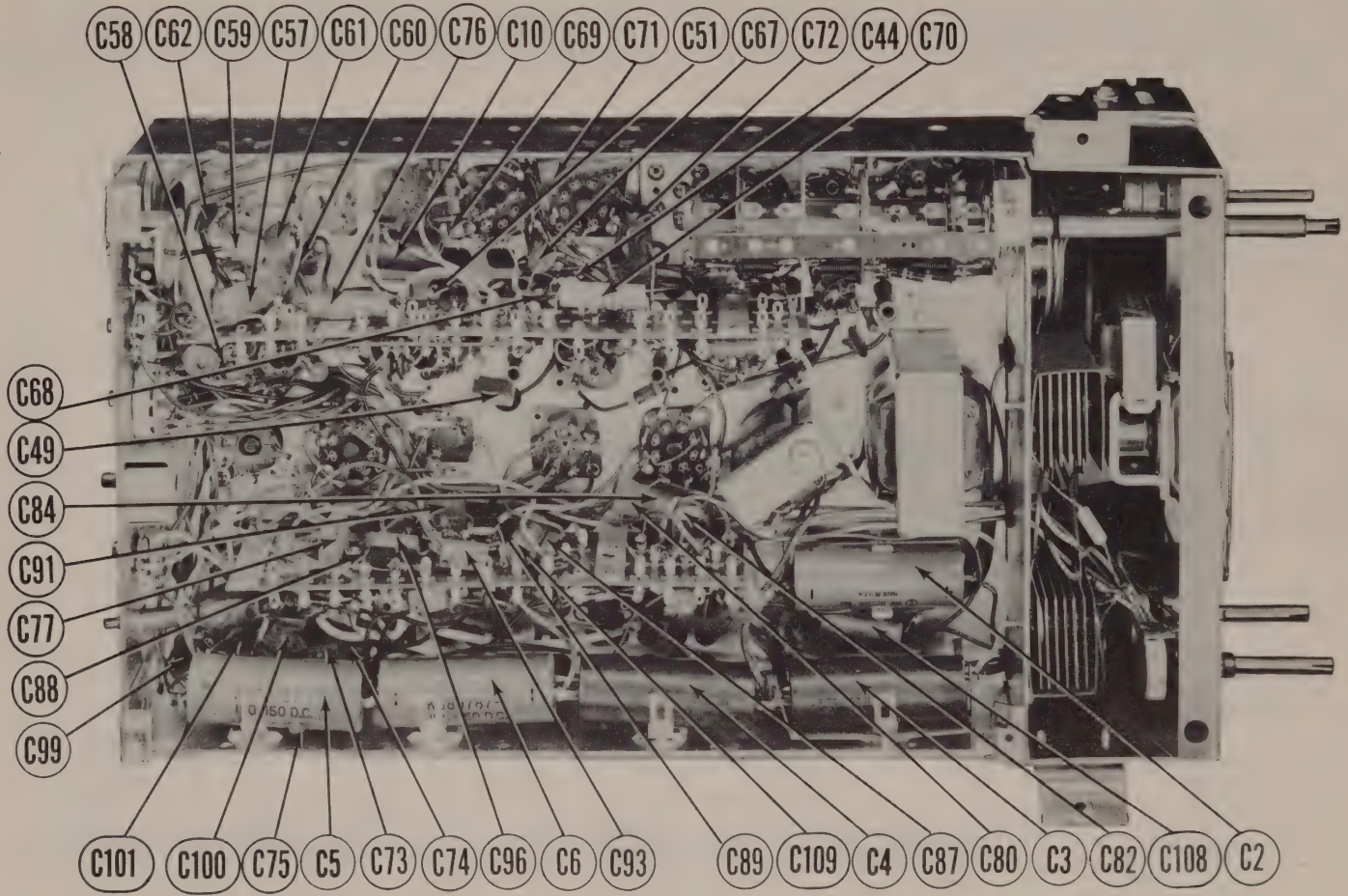
BLOCK DIAGRAM



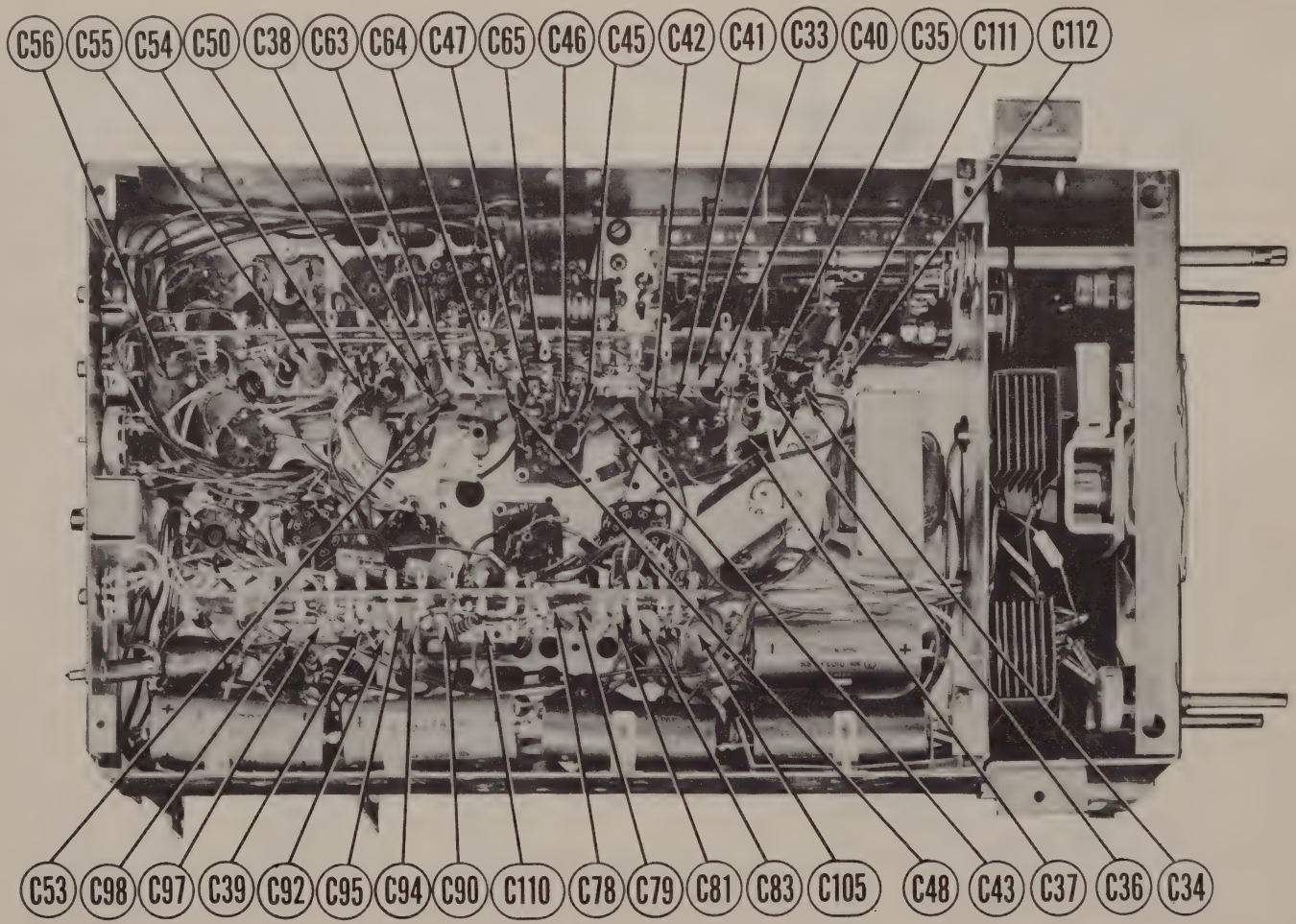
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



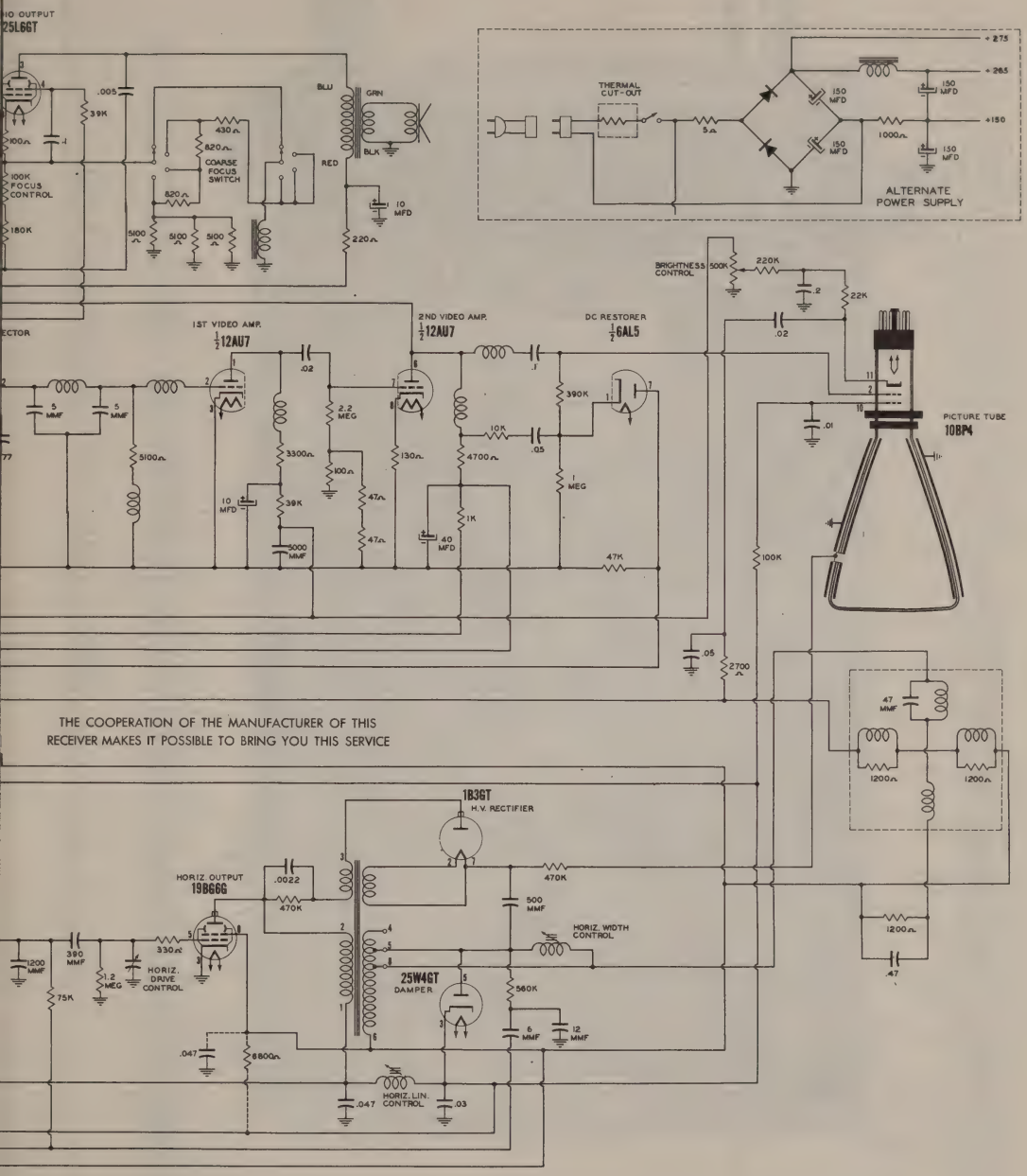
SCHEMATIC-EA



CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION

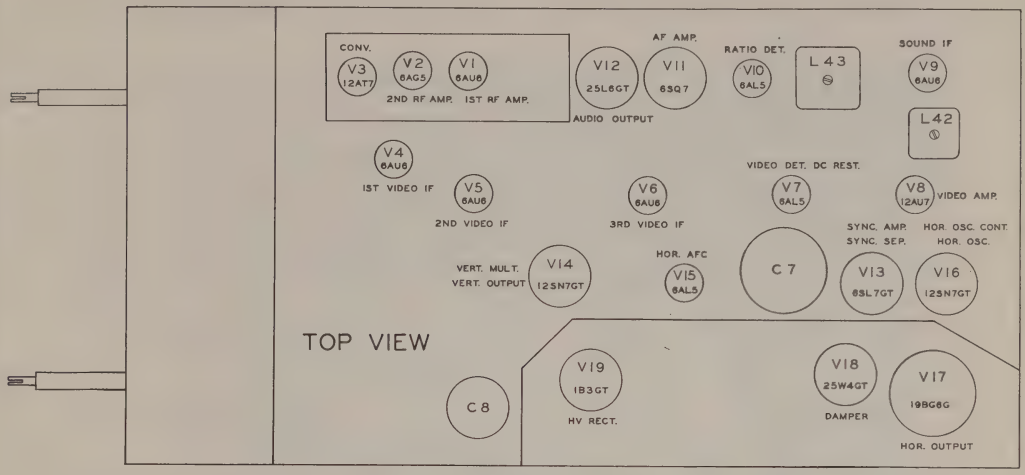


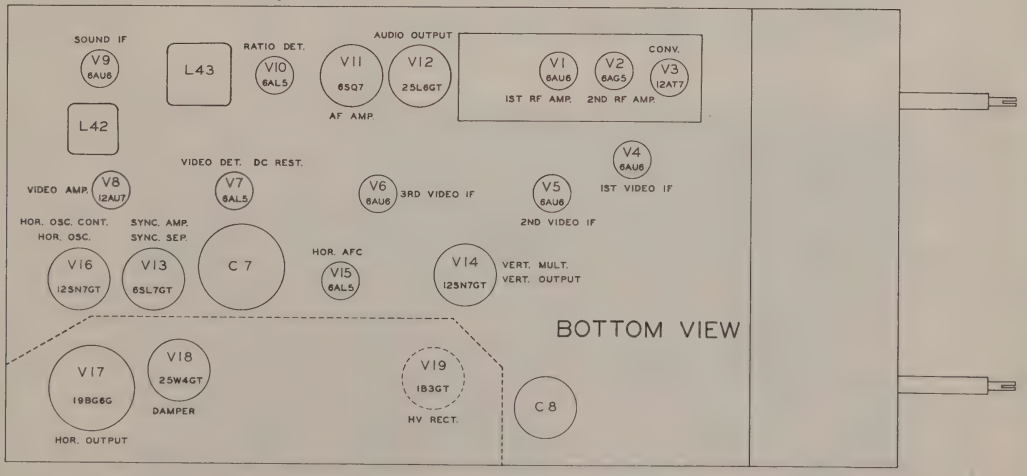
CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RLY VERSIONS





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

An isolation transformer should be used during alignment of this set to protect the test equipment. The RF tuner chassis referred to in the alignment is insulated from the main chassis. A convenient point to connect the low side of the signal generator, or oscilloscope, is the shield between the channel switch sections, on the bottom of the tuner.

VIDEO IF ALIGNMENT

On some models the channel selector switch has stops at the channel 1 and channel 13 positions. On these sets, turn the channel selector switch to channel 5 or 6 during Video IF Alignment. Use the channel which causes the least interference. To check for local oscillator interference, turn the fine tuning control. If there is any change in the response curve, select the other channel.

On some sets, the channel switch has no channel 1 position and no stops.

On these sets, turn the channel switch to the blank position between channels 2 and 13 to disable the local oscillator.

The contrast line should be set at -4 volts. On the earlier model sets that do not have AGC circuit this can be done by adjusting the contrast control to read -4 volts between the junction of R25 and R29 and the tuner chassis.

On the later model sets which have AGC it will be necessary to connect the negative lead of a 4 volt battery to the junction of R25 and R29. Connect the positive lead to the tuner chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V6). Low side to tuner chassis.	25MC (10MC Sweep)	21.8MC 23.3MC 25.55MC 26.3MC	See note above	Vert. Amp. to pin 1 (plate) of 12AU7 (V8). Low side to pin 3 (Cathode) of V8.	A1	Adjust for response similar to Fig. 1 with markers as shown.
2.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V5). Low side to tuner chassis.	"	23.3MC 25.55MC 26.3MC	"	"	A2	Adjust for response curve similar to Fig. 2 with markers as shown.
3.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V4). Low side to tuner chassis.	"	23.3MC 25.55MC 26.3MC	"	"	A3	Adjust for response curve similar to Fig. 3 with markers as shown.
4.	Direct	High side to ungrounded tube shield floating over converter tube (V3). Low side to tuner chassis.	"	23.3MC 25.55MC 26.3MC	"	"	A4,A1	Adjust for response curve as per Fig. 4. The 23.3 and 26.3MC markers should be at 50% response. If necessary, slightly retouch A2, and A3 for proper response.

ADJACENT CHANNEL SOUND TRAP ADJUSTMENT

This adjustment appears only in the sets that have a "V" stamped on the front apron of the chassis. When aligning all other sets, omit this step.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	Direct	High side to ungrounded tube shield floating over converter tube (V3). Low side to tuner chassis.	Not used	27.8MC (Unmod., maximum output)	See note above video alignment.	Connect DC Probe and common lead across R39.	A5	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to pin 7 (Grid) of 12AU7 (V8). Low side to tuner chassis.	4.5MC (Unmod.)	Any channel not used locally.	DC Probe to Point (A) Common to pin 8 of V11.	A6	With signal generator set for approximately .1 volt output, adjust A6 for a reading of -.25 volt on VTVM.
7.	.01MFD	"	"	"	"	A7,A8	Adjust for maximum deflection.
8.	.01MFD	"	"	"	"	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to pin 7 (Grid) of 12AU7 (V8). Low side to tuner chassis.	4.5MC (450KC Sweep)	4.5MC	Any channel unused locally.	Vert. Amp. to Point (B) Low side to pin 3 of V11.	A7,A8	Disconnect stabilizer capacitor C10. Adjust for maximum amplitude and symmetry as per Fig. 5.
7.	.01MFD	"	"	"	"	Vert. Amp. to Point (A) Low side to pin 3 of V11.	A6,A7	Reconnect capacitor C10. Adjust A6 so 4.5MC marker appears at center of crossover lines as per Fig. 6. SLIGHTLY retouch A7 for maximum amplitude and straightness of cross over lines. Continue with step 9.

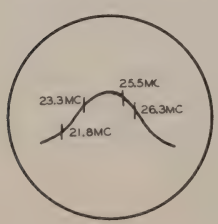


FIG. 1

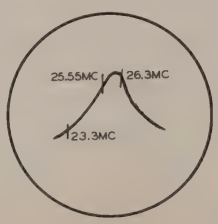


FIG. 2

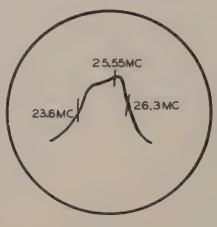


FIG. 3

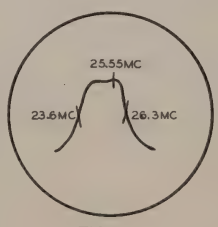
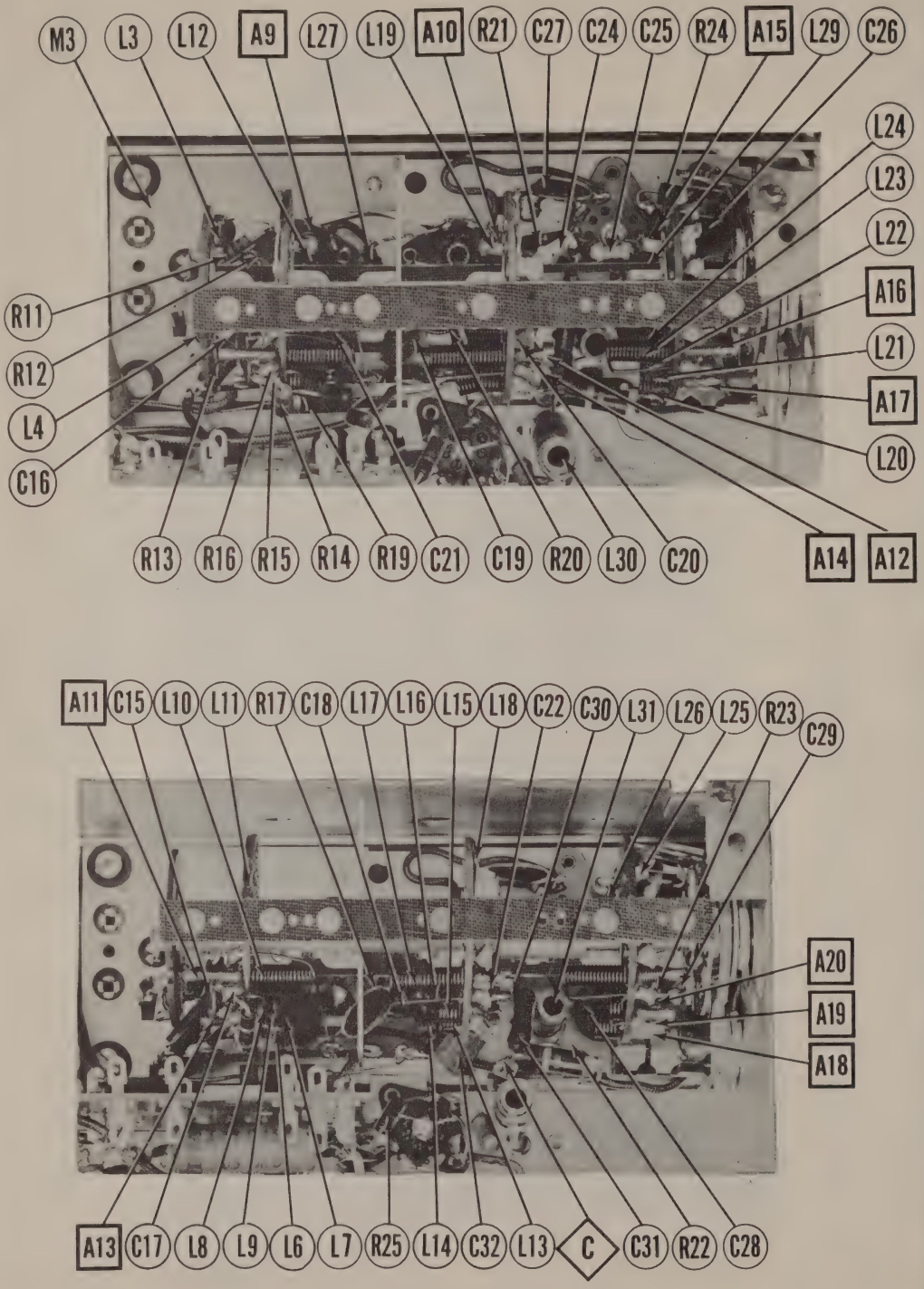
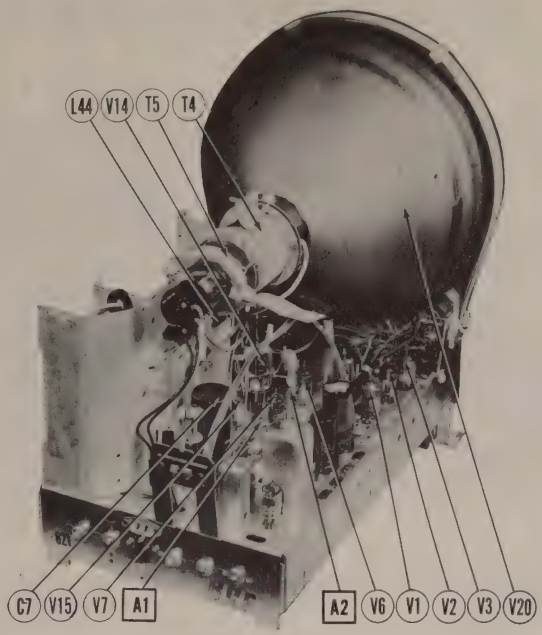


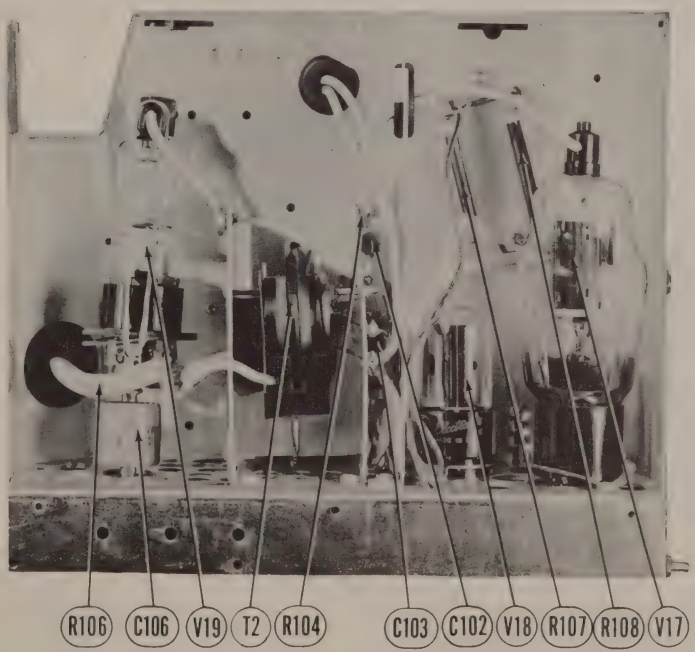
FIG. 4


M3
L3
L12
A9
L27
L19
A10
R21
C27
C24
C25
R24
A15
L29
C26
L24
L23
L22
A16
L21
A17
L20
A14
A12
R11
R12
L4
C16
R13
R16
R15
R14
R19
C21
C19
R20
L30
C20
A11
C15
L10
L11
R17
C18
L17
L16
L15
L18
C22
C30
L31
L26
L25
R23
C29
A20
A19
A18
A13
C17
L8
L9
L6
L7
R25
L14
C32
L13
C
C31
R22
C28

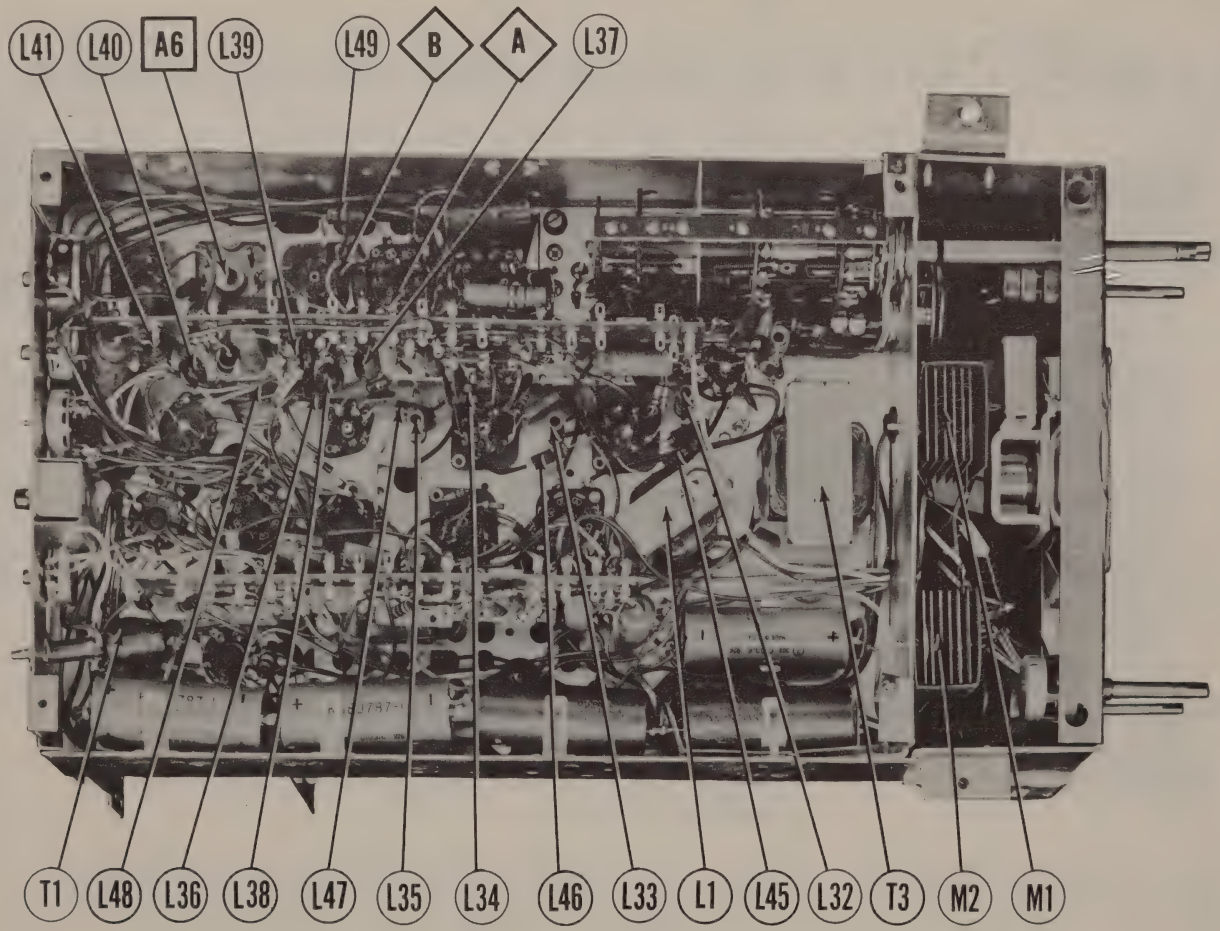
RF TUNER



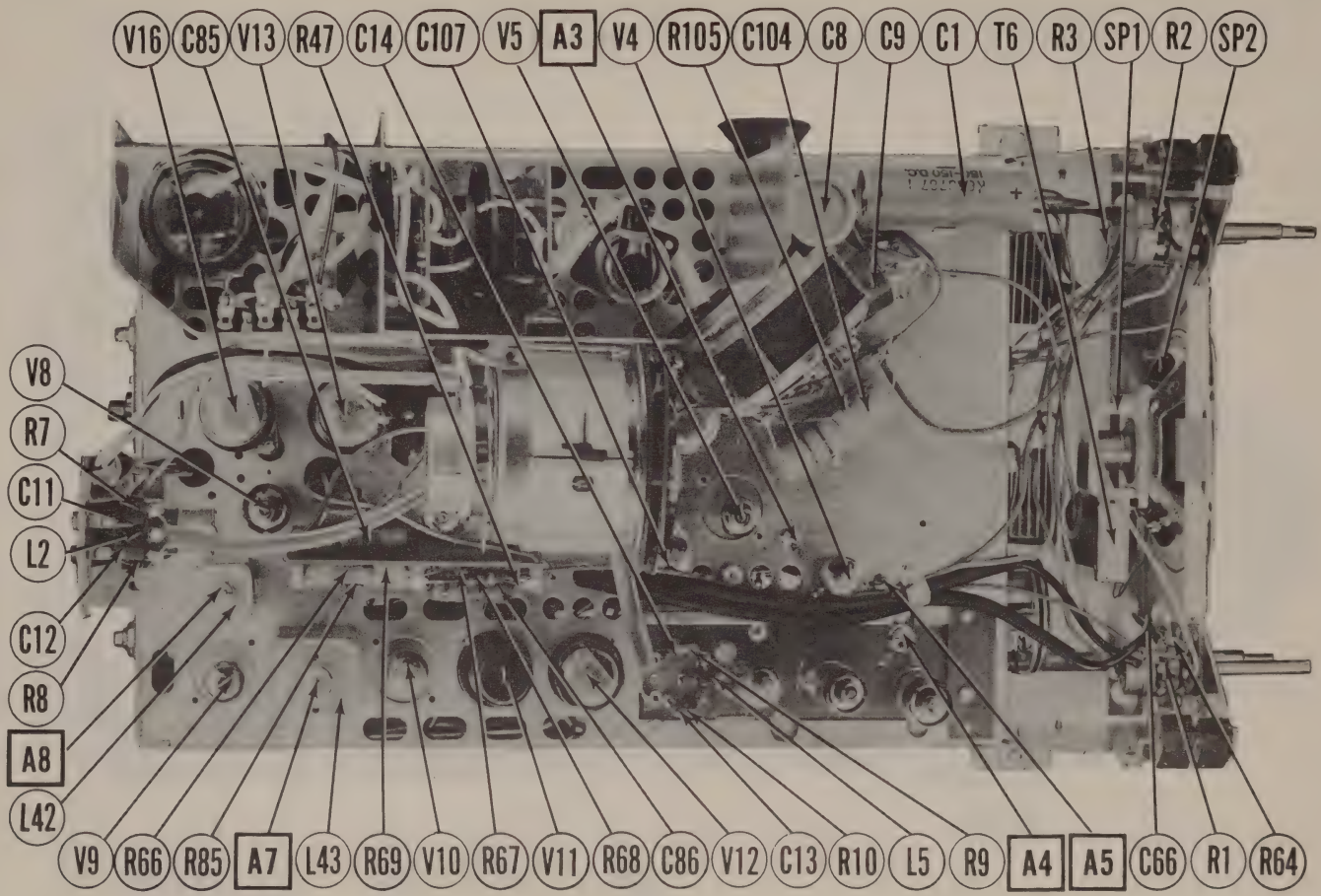
CHASSIS-TOP VIEW



HIGH VOLTAGE SUPPLY



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



CHASSIS TOP VIEW

ALIGNMENT INSTRUCTIONS (CONT.)

RF ALIGNMENT

Set the contrast line to -2 volt, measured from pin 1 of V2 to tuner chassis with VTVM. In the later model chassis that have the AGC circuit use a battery connected as outlined under video IF alignment.
Connect a 220Ω carbon resistor across L31, using the shortest possible leads.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Direct	Across antenna terminals.	213MC (10MC Sweep)	211.25MC 215.75MC	13	Vert. Amp. to Point ◇ Low side to tuner chassis.	A9,A10	Adjust A9 to place 211.25MC markers and A10 to place 215.75MC marker as shown in Fig 7.
10.	Direct	"	207MC (10MC Sweep)	205.25MC 209.75MC	12	"		Check all other high band channels for response similar to Fig 7. The markers hould appear on either side of the response curve at approximate-ly the same height. If necessary retouch A9 and A10 for best compro-mise over all high band channels. The channel 7 response may be narro-wer than channel 13 response.
			201MC (10MC Sweep)	199.25MC 203.75MC	11			
			195MC (10MC Sweep)	193.25MC 197.75MC	10			
			189MC (10MC Sweep)	187.25MC 191.75MC	9			
			183MC (10MC Sweep)	181.25MC 185.75MC	8			
			177MC (10MC Sweep)	175.25MC 179.75MC	7			
11	Direct	"	85MC (10MC Sweep)	83.25MC 87.75MC	6	"	A11, A12	Adjust A11 to place 83.25MC marker and A12 to place 87.75MC marker as per Fig 8.
12	Direct	"	79MC (10MC Sweep)	77.25MC 81.75MC	5	"		Check to see that on channels 4 and 5 the video marker is on top of the response curve, the sound marker is above 50%. If necessary retouch A11 and A12 for optimum response on channels 4, 5, and 6.
			69MC (10MC Sweep)	67.25MC 71.75MC	4			
13	Direct	"	63MC (10MC Sweep)	61.25MC 65.75MC	3	"	A13 A14	Adjust A13 to place 61.25MC marker and A14 to place 65.75MC MC marker as shown in Fig 8.
14	Direct	"	57MC (10MC Sweep)	55.25MC 59.75MC	2	"		Check to see that the video marker is on top of the curve and the sound marker is above 50%. If necessary, retouch A13 and A14 for optimum re-sponse on channels 2 and 3.

OSCILLATOR ALIGNMENT

See instructions under RF alignment.
Set the fine tuning control to the mid position of its range.
It should be noted that all the high band channels oscillator circuits are aligned by one overall adjustment which all the low band channels are aligned by individual adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15	Direct	Across antenna terminals.	237.55MC (Unmod.)	13	Vert. Amp. to Point ◇ Low side to tuner chassis.	A15	Expand or compress coil turns for zero beat on oscilloscope. This will be indicated by a narrow line between two wide traces as coil is adjusted thru zero beat.
16	Direct	"	231.55MC (Unmod.)	12	"		Check all other high band channels. Zero beat on the oscilloscope should occur with the fine tuning control over 1/3 of its range from either end. It may be necessary to readjust A15 to bring all high band channels within the proper range on the fine tuning control.
			225.55MC (Unmod.)	11			
			219.55MC (Unmod.)	10			
			213.55MC (Unmod.)	9			
			207.55MC (Unmod.)	8			
			201.55MC (Unmod.)	7			
17	Direct	"	109.55MC (Unmod.)	6	"	A16	Adjust brass screw for zero beat.
18	Direct	"	103.55MC (Unmod.)	5	"	A17	"
19	Direct	"	93.55MC (Unmod.)	4	"	A18	"
20	Direct	"	87.55MC (Unmod.)	3	"	A19	"
21	Direct	"	81.55MC (Unmod.)	2	"	A20	"

FIG. 5

FIG. 6

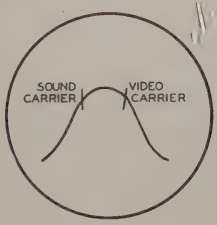


FIG. 7

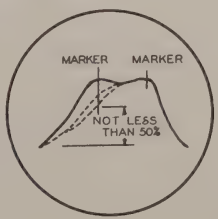


FIG. 8

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	0V	-.6VDC	20VAC	27VAC	160VDC	160VDC	2.2VDC		
V 2	6AG5	-.7VDC	.8VDC	13VAC	20VAC	175VDC	165VDC	.8VDC		
V 3	12AT7	205VDC	§-1.8VDC	0V	6.6VAC	6.6VAC	75VDC	-1.6VDC	0V	13VAC
V 4	6AU6	-3.1VDC	0V	65VAC	56VAC	195VDC	145VDC	0V		
V 5	6AU6	◓ -.9VDC	◓0V	55VAC	50VAC	◓125VDC	110VDC	2.4VDC		
V 6	6AU6	0V	2.4VDC	50VAC	43VAC	245VDC	170VDC	2.4VDC		
V 7	6AL5	2.8VDC	-.4VDC	35VAC	43VAC	0V	0V	0V		
V 8	12AU7	25VDC	-.4VDC	0V	27VAC	27VAC	150VDC	-.6VDC	0V	3.5VAC
V 9	6AU6	♦ .5VDC	♦ 2.5VDC	29VAC	22VAC	♦ 125VDC	♦ 35VDC	♦ 2.5VDC		
V 10	6AL5	0V	0V	14VAC	22VAC	.4VDC	0V	-.5VDC		
V 11	6SQ7	0V	-.5VDC	0V	0V	0V	100VDC	13VAC	6.6VAC	
V 12	25L6GT	0V	105VAC	250VDC	190VDC	4VDC	35VDC	75VAC	35VDC	
V 13	6SL7GT	-3VDC	200VDC	0V	-.8VDC	270VDC	0V	62VAC	55VAC	
V 14	12SN7GT	2.7VDC 5.2VDC	370VDC	20VDC 25VDC	-.9VDC	2.7VDC 5.2VDC	1.4VDC	75VAC	62VAC	
V 15	6AL5	1.9VDC	-2.8VDC	62VAC	70VAC	1.9VDC	135VDC	-8.2VDC		
V 16	12SN7GT	-1VDC	105VDC	0V	-25VDC	245VDC	.2VDC	85VAC	70VAC	
V 17	19BG6G	-45VDC	105VAC	0V	0V	-45VDC	240VDC	85VAC	240VDC	TOP CAP *
V 18	25W4GT	0V	0V	390VDC	240VDC	240VDC	240VDC	29VAC	55VAC	
V 19	1B3GT	* DO NOT MEASURE								TOP CAP *
V 20	12KP4	6.6VAC	3.1VDC	PIN 10 365VDC	PIN 11 100VDC	PIN 12 0V				

§ Taken with vacuum tube voltmeter.
◓ Measured from pin 7 of V5.
♦ Measured from junction of C5 and C6.
* Do not measure

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	0Ω	1.5 Meg.	7Ω	11Ω	†10KΩ	†10KΩ	270Ω		
V 2	6AG5	1.5 Meg.	100Ω	4Ω	7Ω	†10KΩ	†10KΩ	100Ω		
V 3	12AT7	†6KΩ	10KΩ	1Ω	1Ω	1Ω	†100KΩ	220KΩ	0Ω	4Ω
V 4	6AU6	1.5 Meg.	0Ω	42Ω	37Ω	◓39Ω	◓39Ω	0Ω		
V 5	6AU6	2.2 Meg.	2.2 Meg.	35Ω	30Ω	†800Ω	†800Ω	2.2 Meg.		
V 6	6AU6	68KΩ	240Ω	28Ω	24Ω	†1.2KΩ	†28KΩ	240Ω		
V 7	6AL5	1 Meg.	5KΩ	17Ω	22Ω	0Ω	Inf.	0Ω		
V 8	12AU7	♦42KΩ	5KΩ	0Ω	11Ω	11Ω	†7KΩ	2.2 Meg.	0Ω	14Ω
V 9	6AU6	♦470KΩ	♦1000Ω	17Ω	13Ω	†2KΩ	♦25KΩ	♦1000Ω		
V 10	6AL5	Inf.	Inf.	8Ω	13Ω	22KΩ	Inf.	22KΩ		
V 11	6SQ7	33KΩ	4.7 Meg.	0Ω	0Ω	0Ω	†220KΩ	6Ω	1Ω	
V 12	25L6GT	Inf.	58Ω	†150Ω	†40KΩ	600KΩ	1.5KΩ	48Ω	1.5KΩ	
V 13	6SL7GT	800KΩ	†48KΩ	0Ω	2.2 Meg.	♯25KΩ	0Ω	32Ω	28Ω	
V 14	12SN7GT	†7.3Meg. †4.3Meg.	♯2.5KΩ	4KΩ 2KΩ	100KΩ	†7.3Meg. †4.3Meg.	39KΩ	48Ω	42Ω	
V 15	6AL5	1 Meg.	2 Meg.	32Ω	36Ω	1 Meg.	2 Meg.	82KΩ		
V 16	12SN7GT	3 Meg.	†70KΩ	0Ω	68KΩ	♯35KΩ	44Ω	42Ω	36Ω	
V 17	19BG6G	1 Meg.	50Ω	0Ω	Inf.	1 Meg.	†330Ω	42Ω	†450Ω	TOP CAP ♯38Ω
V 18	25W4GT	Inf.	Inf.	220KΩ	†150KΩ	†320Ω	†320Ω	17Ω	28Ω	
V 19	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ♯470KΩ
V 20	12KP4	1Ω	1 Meg.	PIN 10 ♯3.3KΩ	PIN 11 250KΩ	PIN 12 0Ω				

† Measured from output of M1.
◓ Measured from pin 7 of V5.
♦ Measured from junction of C5 and C6.
♯ Measured from pin 3 of V18

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

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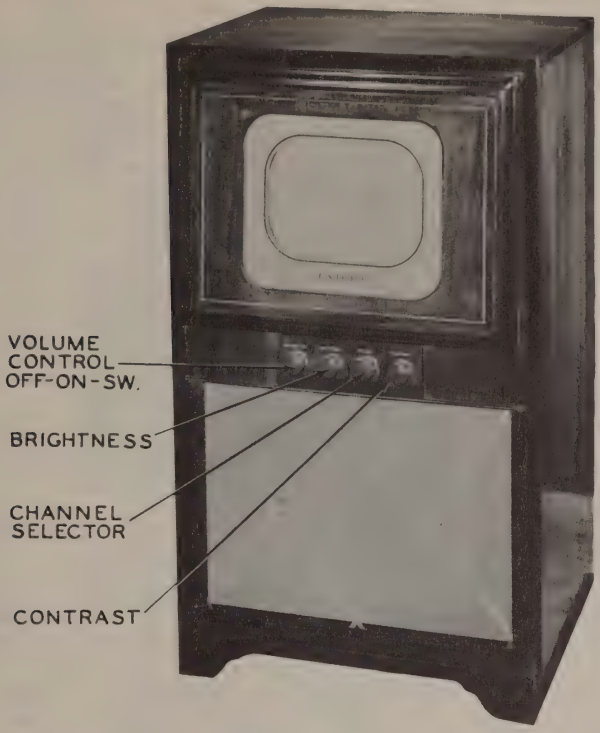

KNIGHT
MODEL 9V-101

TRADE NAME	Knight, Model 9V-101
SUPPLIER	Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.
TYPE SET	Television Receiver
TUBES	Twenty-Three

POWER SUPPLY 110-120 Volts-60 Cycles AC RATING: 1.98 Amp. @ 117 Volts AC
TUNING RANGE—Channels 2 through 13

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Capacitor Identification (RF-IF)	8	Schematic	2
Capacitor Identification (Sweep)	12	Tube Placement Chart (RF-IF)	7
Chassis-Top View (RF-IF)	3	Tube Placement Chart (Sweep)	6
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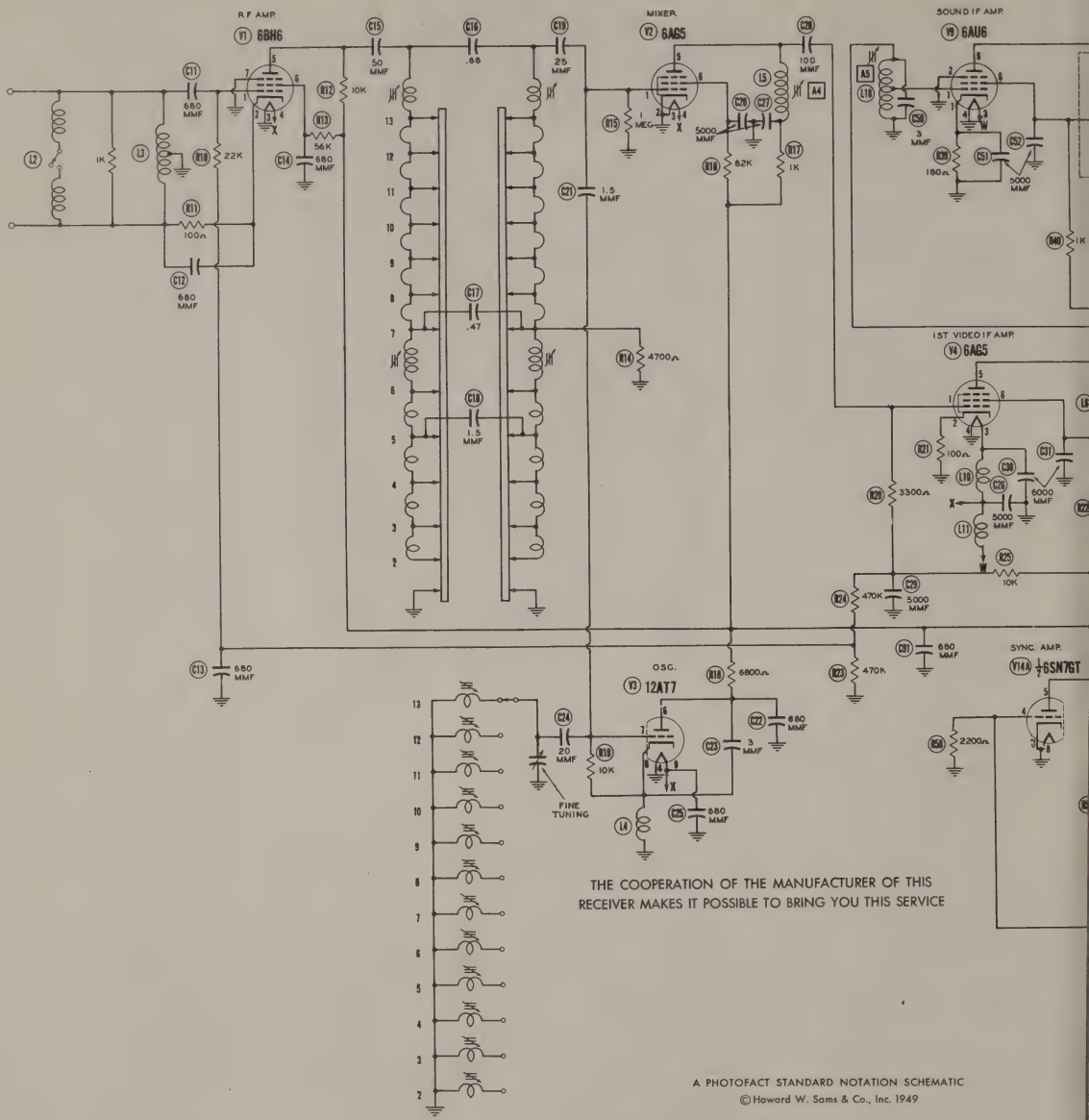
R F AMP.
V1 6BH6
MIXER
V2 6AG5
SOUND IF AMP.
V9 6AU6
1ST VIDEO IF AMP.
V4 6AG5
OSC.
V3 12AT7
SYNC. AMP.
V14A 1/2 6SN7GT
FINE TUNING
THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
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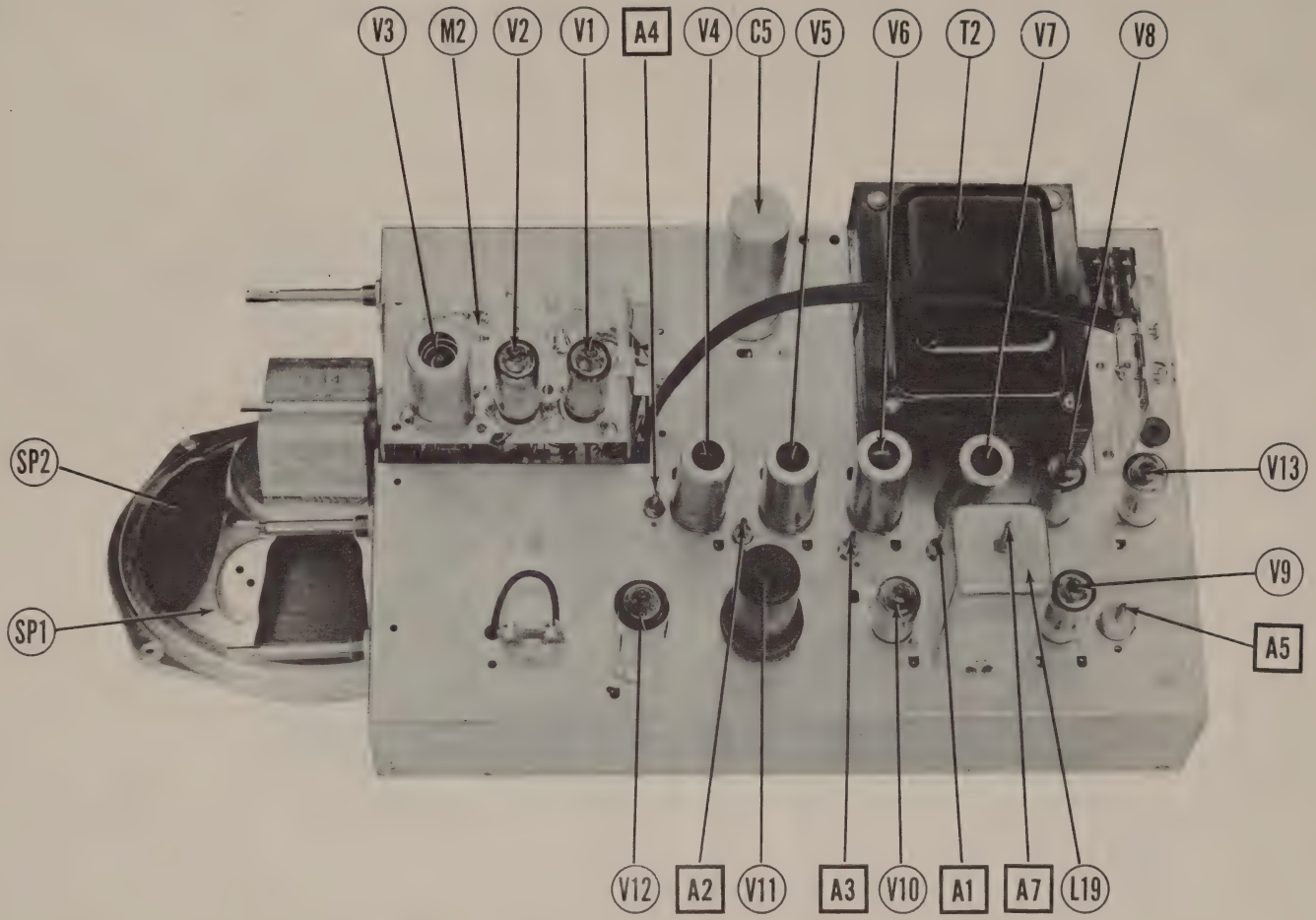
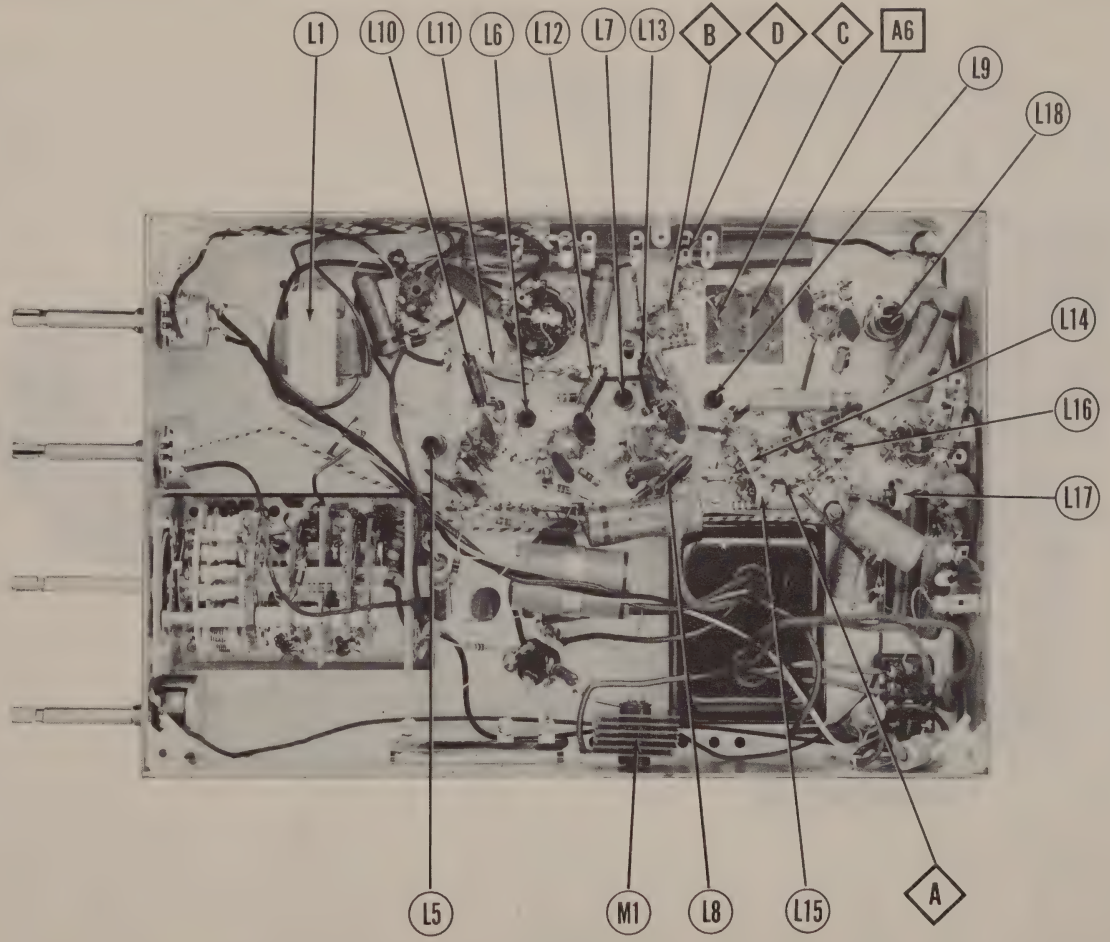


RF-IF CHASSIS-TOP VIEW



RF-IF CHASSIS - BOTTOM VIEW TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The interconnecting cable between the two chassis must be connected for complete alignment. If receiver is to be aligned with picture tube removed, remove horizontal oscillator tube (V16) to remove shock hazard.

VIDEO IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove local oscillator tube (V3) to prevent erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	25.75MC (Unmod.)	Any	DC Probe to Point (A) Common to chassis.	A1,A2	Adjust for maximum deflection.
2.		"	23.4MC	"	"	A3,A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.		High side to ungrounded tube shield floating over mixer tube 6AU5 (V2). Low side to chassis.	24MC (10MC Sweep)	25.75MC 21.25MC	Any	Vert. Amp. to Point (A) Low side to chassis.		Check response as per Fig 1. If necessary slightly retouch A1, A2, A3, A4 to correctly position markers.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 5 (Plate)of 6AU6 (V8). Low side to chassis.	4.5MC (Unmod.)	Any	DC Probe to Point (B) Common to chassis.	A5,A6	Adjust for maximum deflection.
5.	.01MFD	"	"	"	DC Probe to Point (C) Common to Point (D)	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 5 (plate) of 6AU6 (V8). Low side to chassis.	4.5MC (1MC Sweep)	4.5MC	Any	Vert. Amp. to Point (B) Low side to chassis.	A5,A6	Disconnect stabilizer cap. C7. Adjust for maximum amplitude and symmetry as per Fig 2.
5.	.01MFD	"	"	"	"	Vert. Amp. to Point (C) Low side to chassis.	A7	Reconnect stabilizer cap. C7. Adjust A7 so 10.7MC marker occurs at center of diagonal line. Slightly retouch A6 for maximum amplitude and straightness of diagonal line.

OSCILLATOR ALIGNMENT

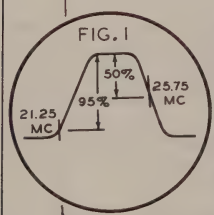
The RF Amplifier and mixer adjustments are pre-set at the factory and are very stable, and normally do not require adjustment in the field.

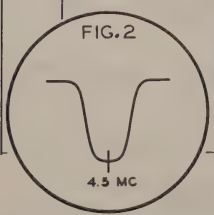
Replace local oscillator tube (V3).

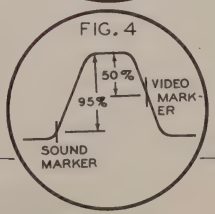
In the event of replacement of the oscillator tube, or oscillator circuit component, complete alignment may not be necessary. Adjustment of A20, which is an overall adjustment may compensate for the change. If it doesn't, complete oscillator realignment is recommended.

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

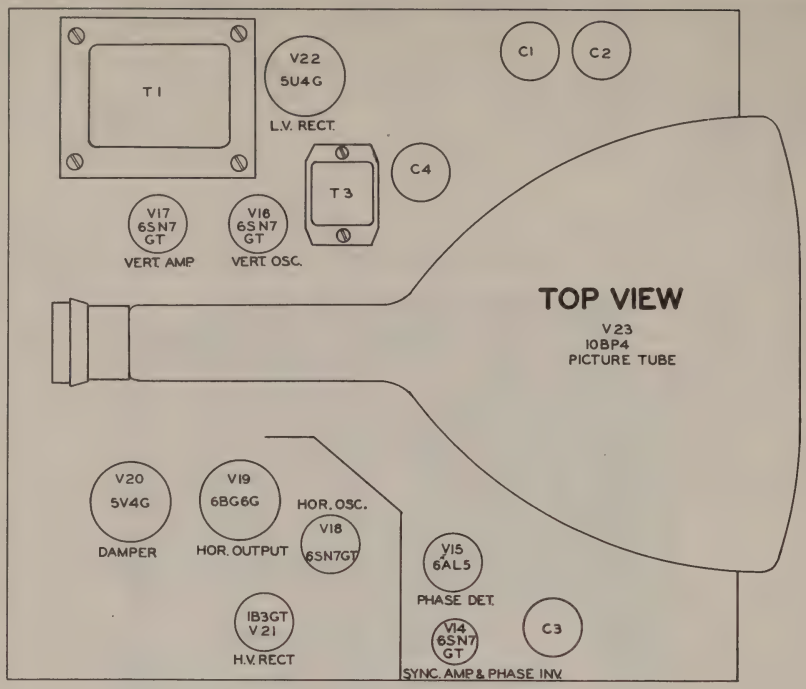
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	Across antenna terminals.	213MC (10MC Sweep)	211.25MC 215.75MC	13	Vert. Amp. to Point (A) Low side to chassis.	A8	Adjust so that markers are properly positioned as per Fig 4. If any channel markers can not be positioned properly it may be necessary to adjust A20. If A20 is adjusted all channels will be affected, and each channel will require readjustment.
			207MC (10MC Sweep)	205.25MC 209.75MC	12		A9	
			201MC (10MC Sweep)	199.25MC 203.75MC	11		A10	
			195MC (10MC Sweep)	193.25MC 197.75MC	10		A11	
			189MC (10MC Sweep)	187.25MC 191.75MC	9		A12	
			183MC (10MC Sweep)	181.25MC 185.75MC	8		A13	
			177MC (10MC Sweep)	175.25MC 179.75MC	7		A14	
			85MC (10MC Sweep)	83.25MC 87.75MC	6		A15	
			79MC (10MC Sweep)	77.25MC 81.75MC	5		A16	
			69MC (10MC Sweep)	67.25MC 71.75MC	4		A17	
			63MC (10MC Sweep)	61.25MC 65.75MC	3		A18	
			57MC (10MC Sweep)	55.25MC 59.75MC	2		A19	

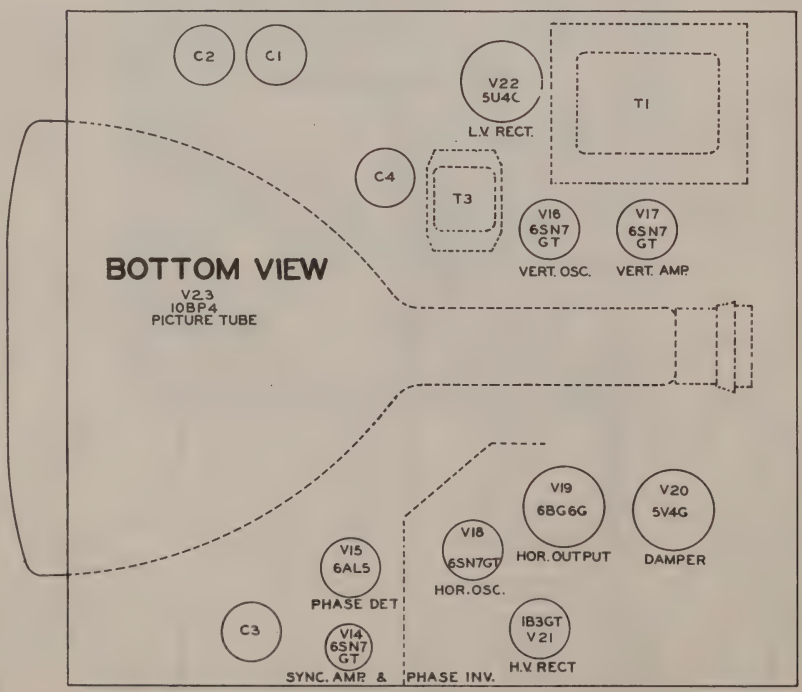




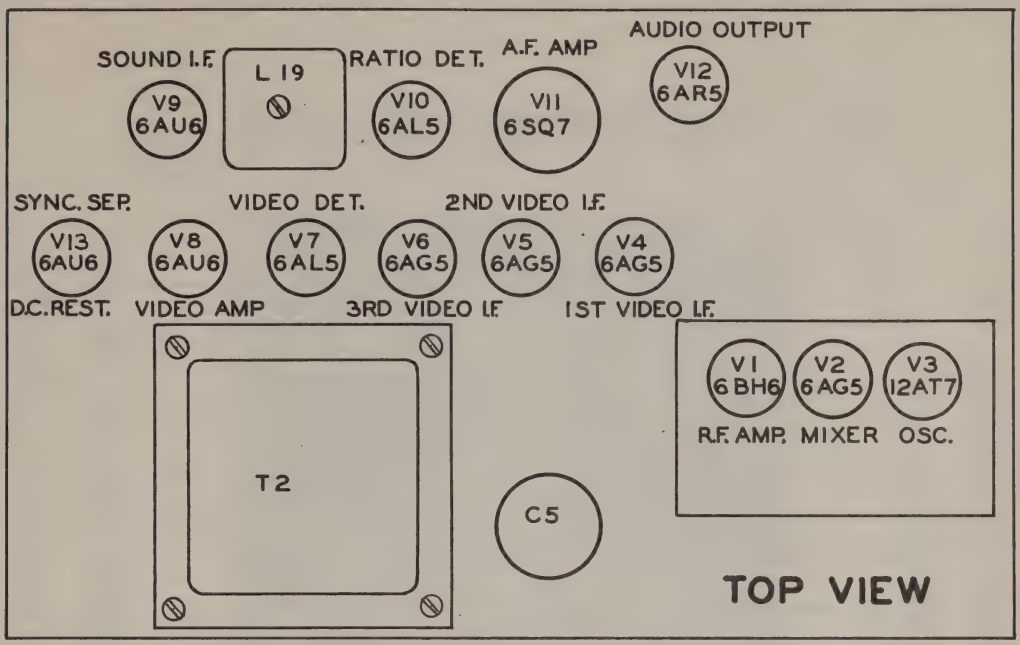


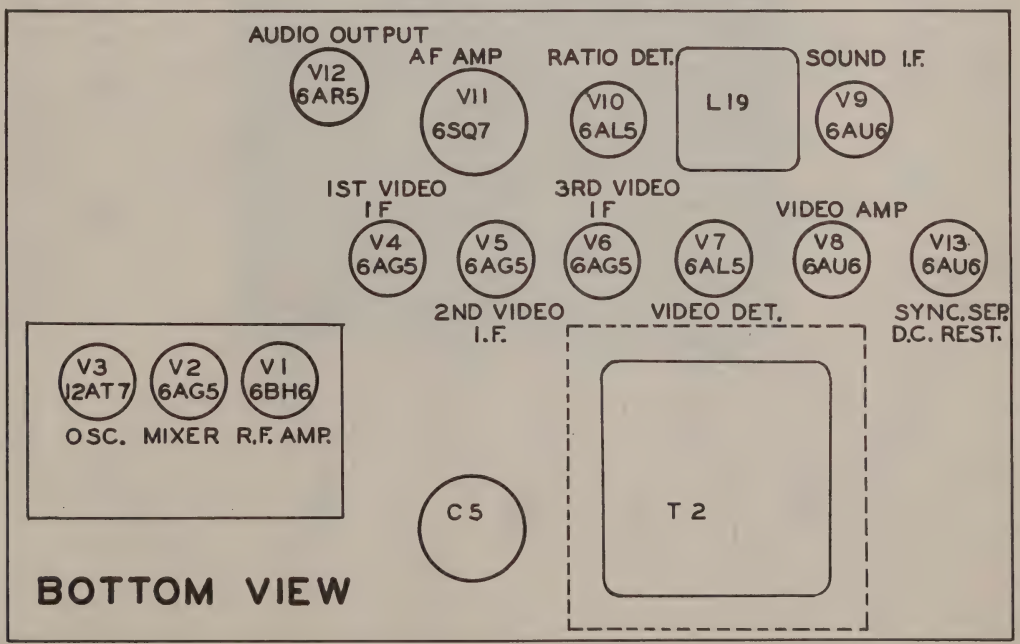
KNIGHT
MODEL 9V-101



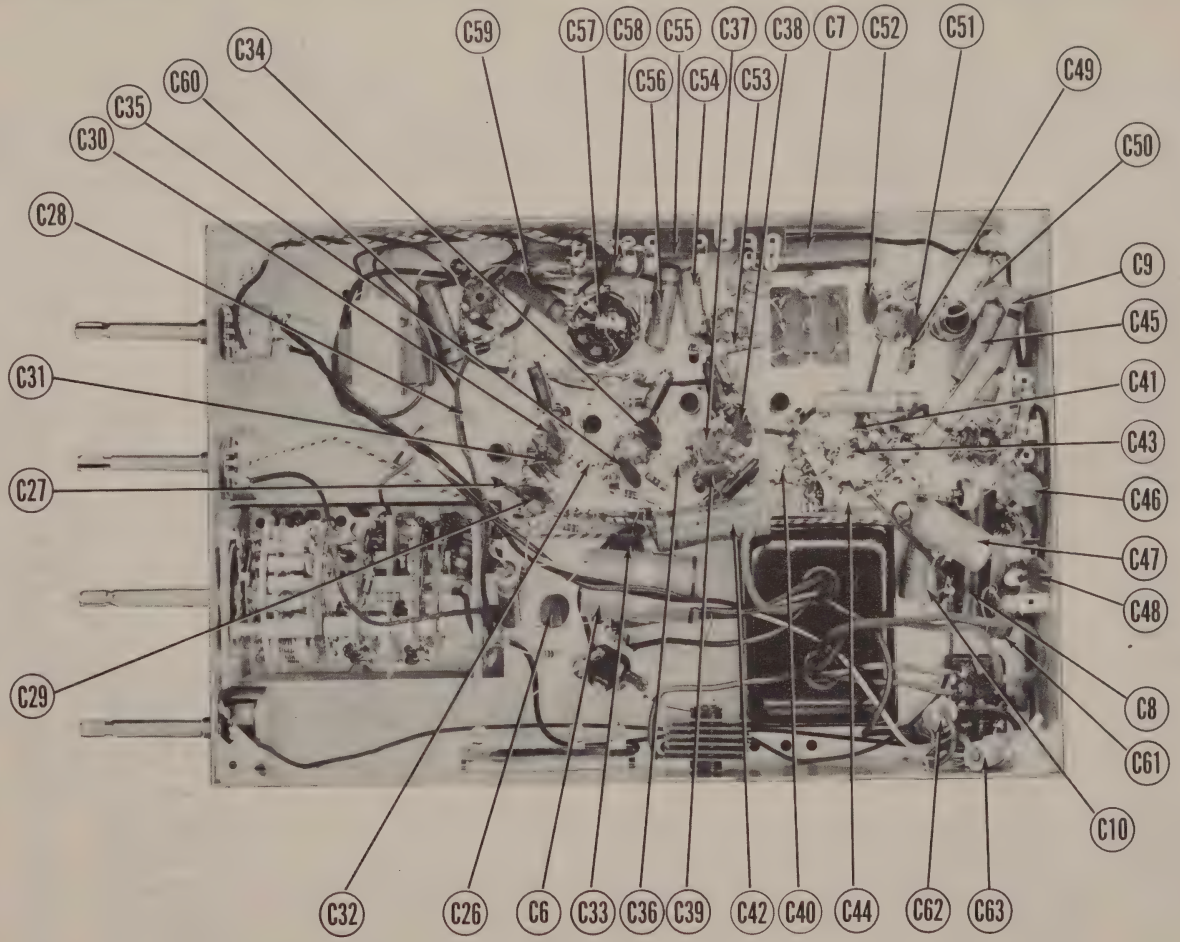


TUBE PLACEMENT-SWEEP CHASSIS

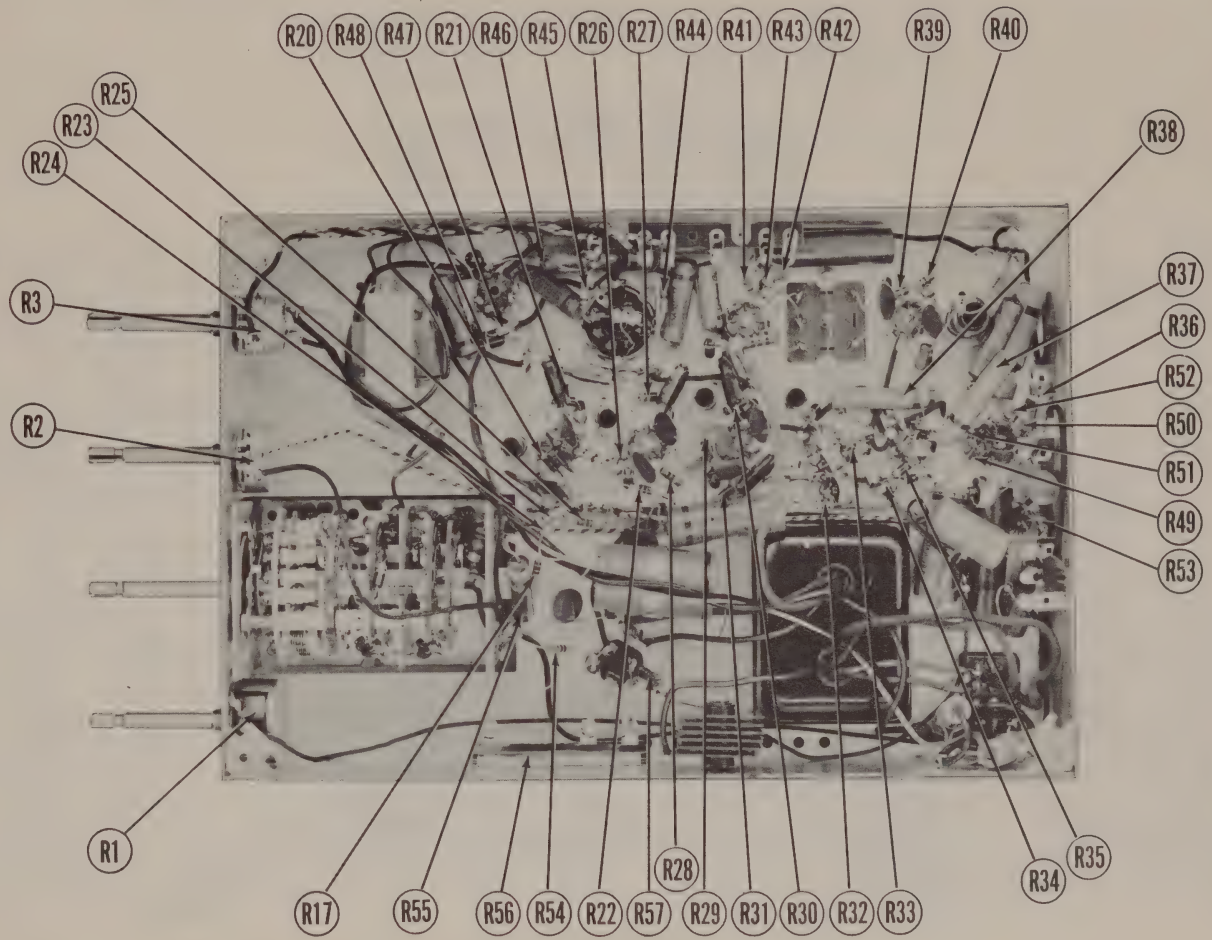




TUBE PLACEMENT- RF-IF CHASSIS



RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION



RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATON

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BH6	-.2VDC	.6VDC	0V	6.3VAC	210VDC	150VDC	0V		
V 2	6AG5	-1.2VDC	0V	0V	6.3VAC	260VDC	145VDC	0V		
V 3	12AT7	0V	0V	0V	0V	0V	210VDC	$-.8VDC	0V	6.3VAC
V 4	6AG5	-1.8VDC	.4VDC	6.3VAC	0V	125VDC	125VDC	.4VDC		
V 5	6AG5	-.5VDC	.3VDC	6.3VAC	0V	125VDC	125VDC	.3VDC		
V 6	6AG5	0V	1.2VDC	6.3VAC	0V	120VDC	120VDC	1.2VDC		
V 7	6AL5	0V	0V	6.3VAC	0V	0V	0V	-1VDC		
V 8	6AU6	.6VDC	0V	6.3VAC	0V	210VDC	160VDC	14VDC		
V 9	6AU6	0V	0V	6.3VAC	0V	125VDC	125VDC	1VDC		
V 10	6AL5	-.2VDC	-.1VDC	6.3VAC	0V	0V	0V	-.3VDC		
V 11	6SQ7	0V	-.6VDC	0V	0V	0V	95VDC	6.3VAC	0V	
V 12	6AR5	0V	15VDC	6.3VAC	0V	230VDC	250VDC	130VDC		
V 13	6AU6	0V	4VDC	6.3VAC	0V	87VDC	130VDC	4VDC		
V 14	6SN7GT	0V	250VDC	10VDC	0V	80VDC	0V	6.3VAC	0V	
V 15	6SN7GT	0V	400VDC	15VDC 20VDC	0V	400VDC	15VDC 20VDC	6.3VAC	0V	
V 16	6AL5	1.3VDC	-6VDC	6.3VAC	0V	-.1VDC	0V	-.1VDC		
V 17	6SN7GT	-110VDC -130VDC	290VDC	0V	-110VDC -130VDC	4VDC	0V	6.3VAC	0V	
V 18	6SN7GT	.5VDC	420VDC	18.5VDC	-4.4VDC -6.1VDC	130VDC	18.5VDC	6.3VAC	0V	
V 19	6BG6G	0V	0V	5.3VDC	0V	-4VDC	250VDC	6.3VAC	250VDC	TOP CAP *
V 20	5V4G	0V	520VDC	520VDC	400VDC	520VDC	400VDC	500VDC	520VDC	
V 21	1B3GT	* DO NOT MEASURE								
V 22	5U4G	0V	440VDC	0V	400VAC	0V	400VAC	0V	440VDC	
V 23	10BP4	0V	4VDC	PIN 10 265VDC	PIN 11 65VDC	PIN 12 6.3VAC				

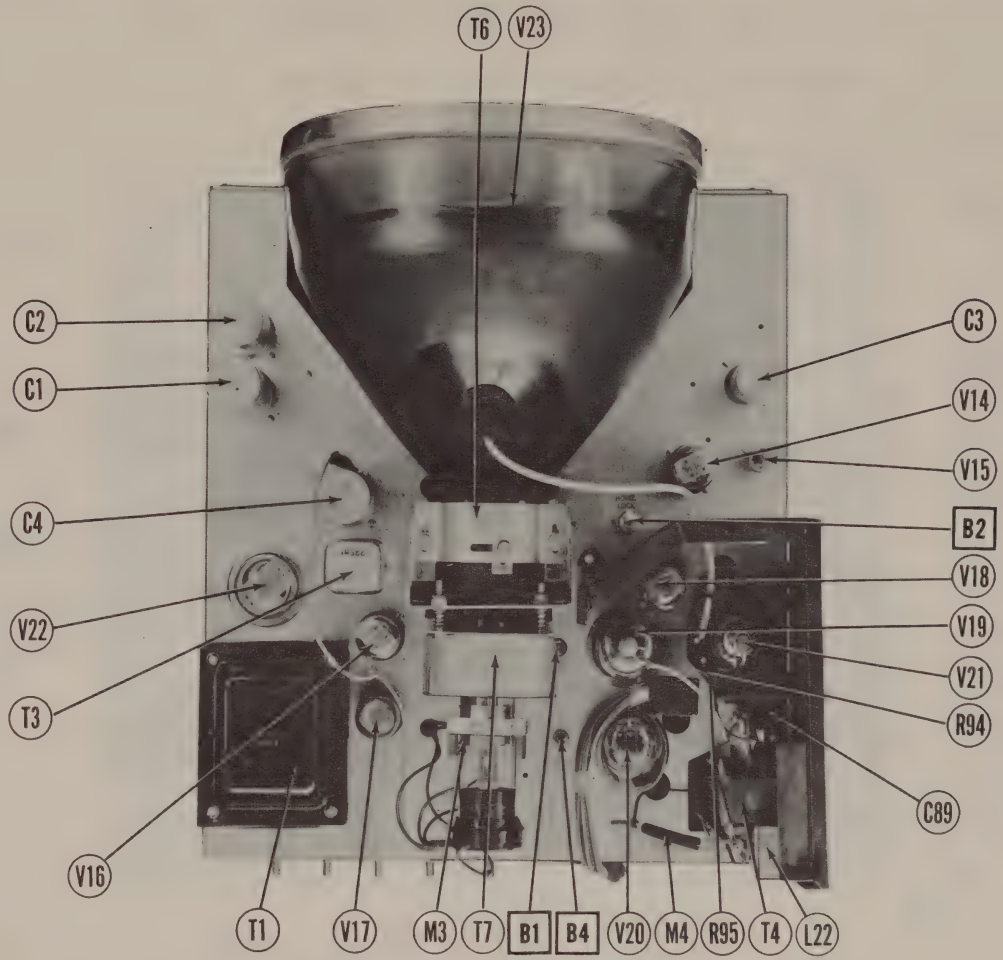
* Do Not Measure.

RESISTANCE READINGS

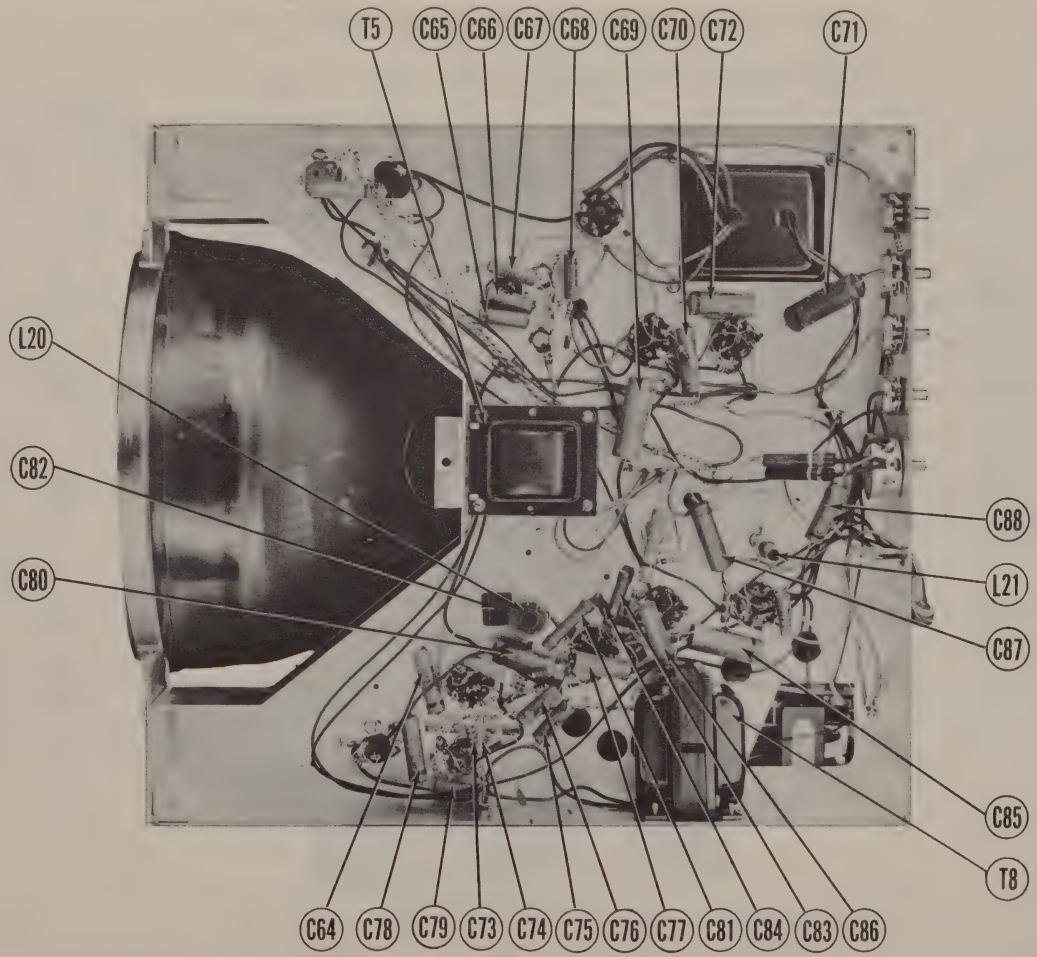
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BH6	500KΩ	100Ω	0Ω	.1Ω	†12KΩ	†60KΩ	0Ω		
V 2	6AG5	1 Meg.	0Ω	0Ω	.1Ω	†3KΩ	†85KΩ	0Ω		
V 3	12AT7	0Ω	0Ω	0Ω	0Ω	0Ω	†7K	10KΩ	0Ω	.1Ω
V 4	6AG5	310KΩ	100Ω	.1Ω	0Ω	♦1.5KΩ	♦1.5KΩ	100Ω		
V 5	6AG5	310KΩ	47Ω	.1Ω	0Ω	♦1.5KΩ	♦1.5KΩ	47Ω		
V 6	6AG5	2.7KΩ	100Ω	.1Ω	0Ω	♦1.5KΩ	♦1.5KΩ	100Ω		
V 7	6AL5	0Ω	Inf.	.1Ω	0Ω	Inf.	0Ω	8.2KΩ		
V 8	6AU6	1 Meg.	0Ω	.1Ω	0Ω	†8KΩ	†8KΩ	1000Ω		
V 9	6AU6	1Ω	0Ω	.1Ω	0Ω	♦1.5KΩ	1.5KΩ	180Ω		
V 10	6AL5	Inf.	Inf.	.1Ω	0Ω	0Ω	0Ω	13KΩ		
V 11	6SQ7	0Ω	10 Meg.	0Ω	Inf.	Inf.	†440KΩ	.1Ω	0Ω	
V 12	6AR5	470KΩ	390Ω	.1Ω	0Ω	†2.5KΩ	†2KΩ	♦550Ω		
V 13	6AU6	1 Meg.	22KΩ	.1Ω	0Ω	♦220KΩ	♦500Ω	22KΩ		
V 14	6SN7GT	1 Meg.	†10KΩ	5KΩ	2.2KΩ	†22KΩ	0Ω	.1Ω	0Ω	
V 15	6SN7GT	4.7 Meg.	†1000Ω	5KΩ 1000Ω	4.7 Meg.	†1000Ω	5KΩ 1000Ω	.1Ω	0Ω	
V 16	6AL5	750KΩ	750KΩ	.1Ω	0Ω	30KΩ	0Ω	30KΩ		
V 17	6SN7GT	1.7 Meg. 750KΩ	†100KΩ	0Ω	1.7 Meg. 750KΩ	♦5 Meg.	0Ω	.1Ω	0Ω	
V 18	6SN7GT	220KΩ	♦10KΩ	1.5KΩ	150KΩ 100KΩ	♦330KΩ	1.5KΩ	.1Ω	0Ω	
V 19	6BG6G	Inf.	0Ω	100Ω	15Ω	470KΩ	8KΩ	.1Ω	†8KΩ	TOP CAP ♦200Ω
V 20	5V4G	Inf.	170KΩ	170KΩ	240Ω	170KΩ	240Ω	170KΩ	170KΩ	
V 21	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ♦460Ω
V 22	5U4G	Inf.	20KΩ	Inf.	50Ω	Inf.	45Ω	Inf.	20KΩ	
V 23	10BP4	0Ω	22KΩ	PIN 10 †1.5KΩ	PIN 11 160KΩ	PIN 12 .1Ω				

† Measured From Pin 8 Of V22.
♦ Measured From Output Of M1.
♣ Measured From Pin 8 Of V20.

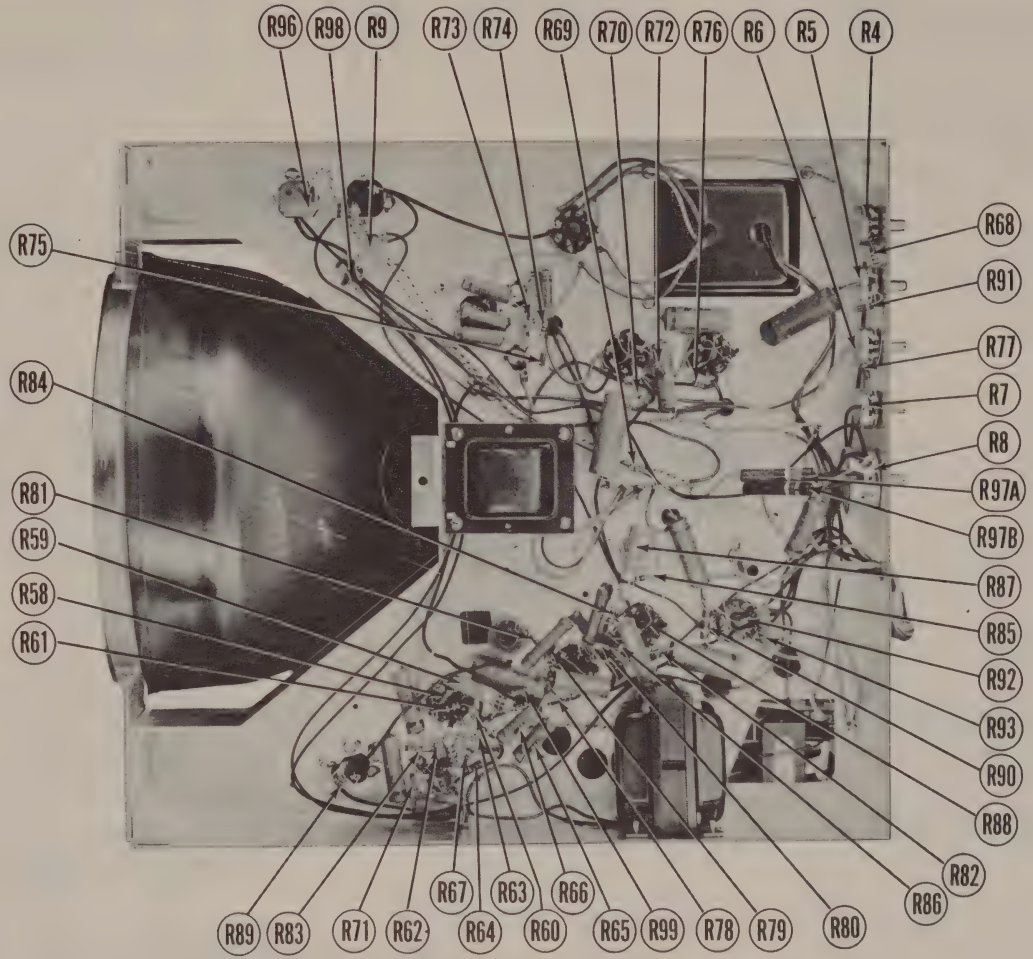
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



SWEEP CHASSIS-TOP VIEW



SWEEP CHASSIS-CAPACITOR IDENTIFICATION



SWEEP CHASSIS-RESISTOR IDENTIFICATION

PARTS LIST AND

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6BH6	6BH6	7CM	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	12AT7	12AT7	9A	
V4	1st Video IF Amp.	6AG5	6AG5	7BD	
V5	2nd Video IF Amp.	6AG5	6AG5	7BD	
V6	3rd Video IF Amp.	6AG5	6AG5	7BD	
V7	Video Det.-AGC	6AL5	6AL5	6BT	
V8	Video Amp.	6AU6	6AU6	7BK	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Det.	6AL5	6AL5	6BT	
V11	AF Amp.	6SQ7	6SQ7	8Q	
V12	Audio Output	6AR5	6AR5	6CC	
V13	Sync. Sep.	6AU6	6AU6	7BK	
V14	Sync. Amp.-Phase Splitter	6SN7GT	6SN7GT	6BD	
V15	Phase Det.	6AL5	6AL5	6BT	
V16	Vert. Osc.	6SN7GT	6SN7GT	6BD	
V17	Vert. Amp.	6SN7GT	6SN7GT	6BD	
V18	Hor. Osc.	6SN7GT	6SN7GT	6BD	
V19	Hor. Output	6BQ6G	6BQ6G	5BT	
V20	Damper	5V4G	5V4G	5L	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	
V23	Picture Tube	10BP4	10BP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	60	450	25E36	AFH128J	UP11CJ		D12114	◓ Filter
B	40	450			835			▲ Filter
C2A	40	450	25E37	AF88J	UP4445		TVL-64	◓ Filter
B	40	450						▲ Filter
C3A	10	450	25E38	AF32J	UP1145		EL-151	■ Decoupling
B	15	450						▲ Decoupling
C4	1000	25	25E39	AF200A	UP1M -25		D12115	Vert. Output Cath. Byp.
C5A	50	150	25E30	AF888D	UP5515		D12112	■ Filter
B	50	150			BR3015			▲ Filter
C	50	150						Filter
C6	40	300	25E31	PRS450/40	BR4035		TVA-24	Decoupling
C7	10	25	25E8	PRS25/10	BBR10-25		TVA-5	Stabilizing Cap
C8	10	25	25E8	PRS25/10	BBR10-25		TVA-5	Sync. Sep. Cath. Byp.
C9	10	250	25E35	PRS250/12	BR1225		UT-201	V Amp. Screen Bypass
C10	100	10	25E12	PRS12/100	BRH151		UHC-112	V Amp. Cath. Bypass
C11	680					GP2K-750		RF Coupling
C12	680					GP2K-750		RF Cath. Bypass
C13	680					GP2K-750		AGC Filter
C14	680					GP2K-750		RF Screen Bypass
C15	50					GP1K50		RF Coupling
C16	.68							RF Coupling
C17	.47							RF Coupling
C18	1.5					NP0K-1.5		RF Coupling
C19	25					GP1K-25		RF Coupling
C20	5000							Mixer Screen Bypass
C21	1.5					NP0K-1.5		Osc. Coupling
C22	680					GP2K-750		Osc. Plate Bypass
C23	3					NP0K-3		Osc. Feedback
C24	20					GP1K-25		Osc. Grid Cap †
C25	680					GP2K-750		Osc. Fil. Bypass
C26	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	Filament Bypass
C27	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	Mixer Plate Dec.
C28	100		23E11	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C29	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	AGC Filter
C30	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	1st V IF Fil. Bypass
C31	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	1st V IF Decoupling
C32	100		23E11	1468-0001	5W5T1	GP1K-100	1FM-25	IF Coupling
C33	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	AGC Filter
C34	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	2nd V IF Fil. Bypass
C35	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	2nd V IF Decoupling
C36	100		23E11	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C37	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	3rd V IF Cath. Bypass
C38	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	3rd V IF Fil. Bypass
C39	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	3rd V IF Decoupling
C40	100		23E11	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C41	5		23E28	1468-000005	5W5V5	NP0K-5	MS-55	V Diode Filter
C42	.25	200	23E222	P488-25	GT2P25		TC-2	AGC Filter
C43	5		23E28	1468-000005	5W5V5	NP0K-5	MS-55	RF Bypass
C44	.1	200	23E2014-9	P288-1	GT2P1		TM-1	Video Coupling
C45	.02	400	23E413	P488-02	GT4S2		TM-12	V Amp. Screen Bypass
C46	.1	400	23E2014-23	P488-1	GT4P1		TM-1	Video Coupling
C47	.2	400	23E2014-22	P488-22	GT4P2		TC-2	Video Coupling
C48	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	Pic Tube Cath. Dec.
C49	2		23E21					S IF Coupling
C50	3		23E13			N750K-3		Fixed Trimmer
C51	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	S IF Cath. Bypass
C52	5000		23E2025	1467-005	1D5D5	GP2M-005	1FM-25	S IF Decoupling
C53	1000		23E2012	1468-001	1W5D1	GP2L-001	1FM-21	Diode Load Cap
C54	.02	400	23E405	P688-002	GT6D2	GP2M-002	TM-22	De-emphasis
C55	.008	400	23E408	P688-005	GT6D5	GP2M-005	TM-25	Audio Coupling
C56	.008	400	23E408	P688-005	GT6D5	GP2M-005	TM-25	Audio Coupling
C57	100		23E11	1468-0001	5W5T1	GP1K-100	1FM-31	AF Plate Bypass
C58	.25	200	23E222	P488-25	GT2P25		TC-2	AF Plate Decoupling
C59	.01	400	23E411	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C60	.005	400	23E408	P688-005	GT6D5	GP2M-005	TM-25	Output Plate Bypass

CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.
C61	.05	200	23E216	P288-05	GT2S5
C62	.01	220AC	23E250	P688-01	GT6S1
C63	.01	220AC	23E250	P688-01	GT6S1
C64	.05	400	23E416	P488-05	GT4S5
C65	.002	400	23E405	P688-002	GT6D2
C66	.002	400	23E405	P688-002	GT6D2
C67	.002	400	23E405	P688-002	GT6D2
C68	.005	400	23E408	P688-005	GT6D5
C69	.2	400	23E420	P488-22	GT4P2
C70	.05	400	23E416	P488-05	GT4S5
C71	.1	600	23E618	P688-1	GT6P1
C72	.1	400	23E418	P488-1	GT4P1
C73	1000		23E2012	1468-001	1W5D1
C74	1000		23E2012	1468-001	1W5D1
C75	.002	400	23E405	P688-002	GT6D2
C76	.002	400	23E405	P688-002	GT6D2
C77	.05	400	23E416	P488-05	GT4S5
C78	.05	400	23E416	P488-05	GT4S5
C79	.005	400	23E406	P688-003	GT6D3
C80	.25	200	23E222	P488-25	GT2P25
C81	250		23E2030-3	1468-00025	5W5T25
C82	4000	500	23E36	1464-004	1R5D4
C83	250		23E2030-3	1468-00025	5W5T25
C84	400		23E2030-4	1468-0004	5W5T4
C85	.25	200	23E222	P488-25	GT2P25
C86	.05	400	23E416	P488-05	GT4S5
C87	.1	400	23E418	P488-1	GT4P1
C88	.05	400	23E416	P488-05	GT4S5
C89	500	1000	23E2029		
C90	125		23E2030-7		
C91	680				

† Some Models Use 25MMF In This Applicat
* Not Used In All Models.

CO

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: IRC PART No.	CLAR PAR
R1	100Ω	2	28E31		43-1
R2A	25KΩ	½	28E32	Q11-120	AM-4
B	Shaft		Not Req.	Not Req.	KSS-
R3A	500KΩ	½	28E33	Q13-133	AM-6
B	Shaft		Not Req.	Not Req.	KSS-
C	Switch		Not Req.	76-1	SW-A
R4	1 Meg.	½	28E36	Q11-137	M-61
R5	250KΩ	½	28E45	Q11-130	M-55
R6	500Ω	½	28E44	Q11-114	M-19
R7	50KΩ	½	28E43	Q11-123	M-44
R8	1.5ΩΩ	4	28E42		10-1
R9	20Ω	2	28E49		

RES

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: IRC PART No.
R10	22KΩ	½		
R11	100Ω	½		
R12	10KΩ	1		
R13	56KΩ	½		
R14	4700Ω	½		
R15	1 Meg.	½		
R16	82KΩ	½		
R17	1000Ω	½		
R18	6800Ω	1		
R19	10KΩ	½		
R20	3300Ω	½	27E332	
R21	100Ω	½	27E101	
R22	1000Ω	½	27E102	BTS-1000
R23	470KΩ	½	27E474	BTS-470K
R24	470KΩ	½	27E474	BTS-470K
R25	10KΩ	½	27E103	BTS-10K
R26	4700Ω	½	27E472	BTS-4700
R27	47Ω	½	27E470	
R28	1000Ω	½	27E102	BTS-1000
R29	2700Ω	½	27E272	BTS-2700
R30	100Ω	½	27E101	
R31	1000Ω	½	27E102	BTS-1000
R32	470KΩ	½	27E474	BTS-470K
R33	8200Ω	½	27E822	BTS-8200
R34	1 Meg.	½	27E105	BTS-1 Meg.
R35	68Ω	1	27E680	BW-1-68
R36	6800Ω	1	27E682-3	BTA-6800
R37	6800Ω	2	27E682-5	BT-2-6800
R38	15Ω	2	27E153-5	BT-2-15K
R39	180Ω	½	27E181	
R40	1000Ω	½	27E102	BTS-1000
R41	6800Ω	½	27E682-2	BTS-6800
R42	6800Ω	½	27E682-2	BTS-6800
R43	39KΩ	½	27E393	BTS-39K
R44	10 Meg.	½	27E106	BTS-10 Meg.
R45	220KΩ	½	27E224	BTS-220K
R46	220KΩ	½	27E224	BTS-220K
R47	470KΩ	½	27E474	BTS-470K
R48	390Ω	2	27E391-5	BT-2-390
R49	1 Meg.	½	27E105	BTS-1 Meg.
R50	220KΩ	½	27E224	BTS-220K
R51	22KΩ	½	27E223	BTS-22K
R52	100KΩ	½	27E104	BTS-100K

ESCRIPTIONS

NT.)

IE No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
	TM-15	Sync. Coupling
	TM-11	Line Filter
	TM-11	Line Filter
	TM-15	Sync. Coupling
-002	TM-22	Integrator Net
-002	TM-22	Integrator Net
-002	TM-22	Integrator Net
-005	TM-25	Vert. Osc. Grid Cap
	TC-2	Vert. Osc. Plate Dec.
	TM-15	Vert. Discharge
	TM-1	Vert. Osc. Plate Dec.
	TM-1	Vert. Sweep Coupling
-001	1FM-21	Hor. Sync. Coupling
-001	1FM-21	Hor. Sync. Coupling
-002	TM-22	AFC Filter
-002	TM-22	AFC Filter
	TM-15	AFC Filter
	TM-15	AFC Feedback
-003	TM-23	Voltage Divider
	TC-2	AFC Filter
-250	1FM-325	Hor. Osc. Feedback
	MS-24	Fixed Trimmer
-250	1FM-325	Hor. Sweep Coupling
	1FM-34	Hor. Discharge
	TC-2	Hor. Output Cath. Byp.
	TM-15	Hor. Output Screen Byp.
	TM-1	Damper Filter
	TM-15	Damper Filter
500		H V Filter
		Hor. Def. Coil Shunt*
		RF Bypass

OLS

INSTALLATION NOTES
Contrast Control (Wire Wound)
Brightness Control
Attach to R2A Per Instructions
Volume Control
Attach to R3A Per Instructions
Attach to R3A Per Instructions
Vertical Hold Control
Height Control
Vertical Linearity Control
Horizontal Hold Control
Focus Control (Wire Wound)
Horizontal Centering Control

RS

IDENTIFICATION CODES RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.	
Grid	20%
Cathode	20%
Plate	20%
Screen	20%
er Coil Shunt	20%
er Grid	20%
er Screen	20%
er Plate Decoup.	
. Plate	20%
. Grid	20%
Video IF Grid	
Video IF Cathode	
Video IF Decoup.	
Network	20%
Network	20%
Network	
Video IF Grid	
Video IF Cathode	
Video IF Decoup.	
Video IF Grid	
Video IF Cathode	
Video IF Decoup.	
Network	20%
o Det. Diode Load	
o Amp. Grid	20%
o Amp. Cathode	
o Amp. Plate	
o Amp. Screen	
ider	
d IF Cathode	
d IF Decoup.	
o Det. Diode Load	
o Det. Diode Load	
mphasis	
rid	20%
late	20%
late	20%
ut Grid	
ut Cathode	
. Sep. Grid	20%
. Sep. Plate	20%
. Sep. Cathode	
e Correction	20%

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA KNIGHT PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
R53	150KΩ	½	27E154	BTS-150K	Voltage Divider 20%
R54	22KΩ	½	27E223	BTS-22K	Voltage Divider
R55	470Ω	2	27E471-5	BW-2-470	Filter Wire Wound
R56A	400Ω	5	27E1006	AB-400	Filter Wire Wound
B	120Ω	5		AB-125	Filter Wire Wound
R57	33Ω	1	27E330-3		Surge Limiter
R58	2200	½	27E222	BTS-2200	Sync. Amp. Grid
R59	22KΩ	½	27E223-5	BT-2-22K	Sync. Amp. Plate
R60	1 Meg.	½	27E105-2	BTS-1 Meg.	Sync. Phase Inverter Grid 20%
R61	4700Ω	½	27E472-2	BTS-4700	Sync. Phase Inverter Cathode
R62	4700Ω	½	27E472-2	BTS-4700	Sync. Phase Inverter Plate
R63	4700Ω	½	27E472-2	BTS-4700	Sync. Phase Inverter Plate
R64	33KΩ	½	27E333-2	BTS-33K	Horiz. AFC Diode Load
R65	470KΩ	½	27E474-2	BTS-470K	Horiz. AFC Diode Load
R66	470KΩ	½	27E474-2	BTS-470K	Horiz. AFC Diode Load
R67	33KΩ	½	27E333-2	BTS-33K	Horiz. AFC Diode Load
R68	680KΩ	½	27E684-2	BTS-680K	Vert. Osc. Grid
R69	100KΩ	½	27E104-2	BTS-100K	Vert. Osc. Plate Decoup.
R70	6800Ω	½	27E682-2	BTS-6800	Vert. Peaking
R71	27KΩ	½	27E273-2	BTS-27K	Phase Det. Cathode
R72	4.7 Meg.	½	27E475-2	BTS-4.7 Meg	Vert. Discnarge Plate
R73	8200Ω	½	27E822-2	BTS-8200	Integrator
R74	8200Ω	½	27E822-2	BTS-8200	Integrator
R75	22KΩ	½	27E223-2	BTS-22K	Integrator
R76	4.7 Meg.	½	27E475-2	BTS-4.7 Meg	Vert. Amp. Grid 20%
R77	1000Ω	½	27E102-2	BTS-1000	Vert. Amp. Cathode
R78	220KΩ	½	27E224-2	BTS-220K	Horiz. Osc. Grid 20%
R79	1500Ω	½	27E102-2	BTS-1500	Horiz. Osc. Cathode
R80	100KΩ	½	27E104-2	BTS-100K	Horiz. Osc. Grid 20%
R81	5600Ω	½	27E1009-8	BTS-5600-5%	Horiz. Osc. Plate 5%
R82	330KΩ	½	27E1009-9	BTS-330-5%	Horiz. Osc. Plate 5%
R83	4700Ω	½	27E472-2	BTS-4700	Feed Back
R84	47Ω	½	27E470-2		Parasitic Supp.
R85	470KΩ	½	27E474-2	BTS-470K	Horiz. Output Grid 20%
R86	100Ω	1	27E101-3	BW-1-100	Horiz. Output Cathode Wire Wound
R87	6800Ω	2	27E682-5	BT-2-6800	Horiz. Output Screen
R88	100Ω		27E101-2		Parasitic Supp.
R89	2200Ω	½	27E222-2	BTS-2200	Filter
R90	1800Ω	1	27E182-3	BTA-1800	Filter
R91	100KΩ	½	27E104-2	BTS-100K	Voltage Divider
R92	4700Ω	½	27E472-2	BTS-4700	Horiz. Linearity Coil Shunt
R93	.65Ω	4	27E1013		Damper Filament (Wire Wound)
R94	3.3Ω	½	27E1015-4	BW-½-3.3	HV Filament (Wire Wound)
R95	1 Meg.	½	27E105		HV Filter
R96	1000Ω	2	27E102-5	BW-2-1000	Filter
R97A	270Ω	2		BW-2-270	Focus Coil Shunt Wire Wound
B	270Ω	2		BW-2-270	Focus Coil Shunt Wire Wound
R98	1200Ω	11	27E1012	AB-1200	Filter Wire Wound
R99	33KΩ	½	27E333-2	BTS-33K	AFC Filter Network

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA KNIGHT PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA CHICAGO PART No.	REPLACEMENT DATA MERIT PART No.
T1	117VAC @ 1.35A	750VCT @ .210 ADC	5VAC @ 3A		22E30			
T2	117VAC @ .77A	117VAC @ .035 ADC	6.3VAC @ 2A	6.3VAC @ 4A SEC. 4 6.3VAC @ 4.3A	22E27			

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA KNIGHT PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA CHICAGO PART No.	REPLACEMENT DATA MERIT PART No.	NOTES
T3	170Ω	9.0Ω	22E31	A-8121	TS0-1	A-3000	Vert.Block Osc.Trans.
T4	430Ω Tap @ 165Ω	SEC. 1 80 Tap @ .52 SEC. 2 0Ω	22E34	A-8117	TFB-1		Hor. Output Trans.
T5	560Ω	6.8Ω	22E33	A-8115	TS0-1	A-3035	Vert.Output Trans.
T6A	14Ω		2280	DY-1			Hor. Deflection Yoke
B	08Ω						Vert. Deflection Yoke
T7	245Ω		20E424				Focus Coil

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA KNIGHT PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA CHICAGO PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
T8	7200Ω	3.7Ω	600Ω	.5Ω	22E35	A-3850	RO-13	A-2900	

KNIGHT MODEL 9V-101

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	KNIGHT PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	3.7Ω	1E34	ST-117 MOD.P8-T	8A31	
	CONE DIA.	V. C. DIA.				
SP2	7 1/4"	3/4"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∽)	KNIGHT PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	
L1	.210A	160Ω	8.5Henries	22E32	C-1721 ‡‡		C-2991‡‡	‡‡ Drill new mounting holes.

COILS (RF-IF)

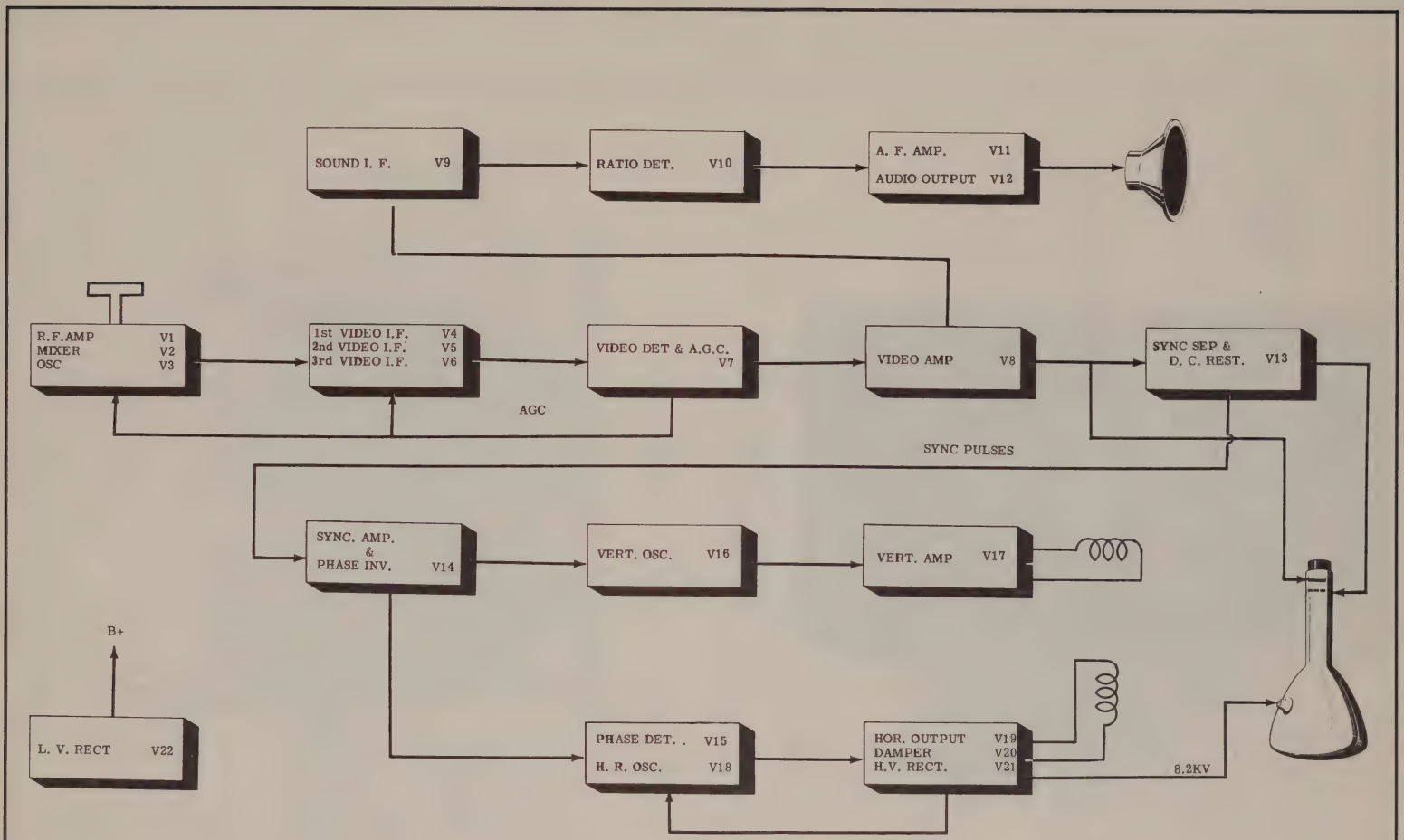
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	KNIGHT PART No.	MEISSNER PART No.	
L2	Ant. Loading	0Ω				For channels 7-13, part of M2.
L3	Ant. Loading	0Ω				For channels 2-6, Part of M2 wound on 1000Ω resistor.
L4	RF Choke	0Ω				
L5	1st Video IF	.1Ω		20E360		
L6	2nd Video IF	.1Ω		20E360		
L7	3rd Video IF	.1Ω		20E360		
L8	Peaking	2.5Ω		2E79		Wound on 15KΩ resistor.
L9	4th Video IF	.1Ω		20E360		
L10	Fil. Choke	.1Ω		2E78		
L11	Fil. Choke	.1Ω		2E78		
L12	Fil. Choke	.1Ω		2E78		
L13	Fil. Choke	.1Ω		2E78		
L14	Peaking	9Ω		20E363-2		Wound on 33KΩ resistor.
L15	Peaking	14.5Ω		20E363-4		Wound on 8.2KΩ resistor
L16	Peaking	13.5Ω		20E363-3		Wound on 15KΩ resistor
L17	Peaking	13Ω		20E363-5		Wound on 10Meg. resistor
L18	Sound IF	4Ω		20E361		
L19	Ratio Det. Trans.	3.5Ω	.5Ω	20E362		
L20	Hor. Osc.	60Ω		20E409		
L21	Hor. Linearity	20Ω		20E410		
L22	Width Control	.4Ω		20E415		

SELENIUM RECTIFIER

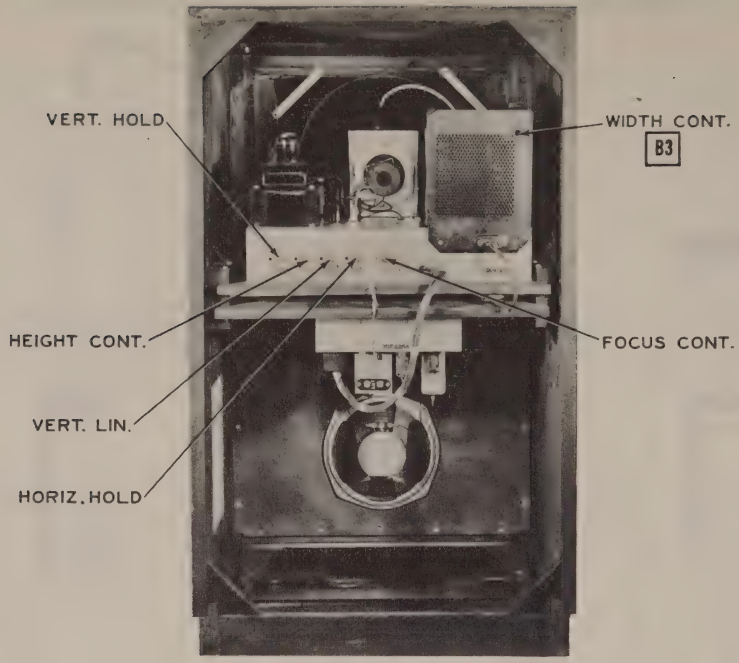
ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	KNIGHT PART No.			
M1	.035A	57E3			

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M2	Tuner	20E364	Complete
M3	Ion Trap	15E122	
M4	Fuse	40E6	Type AGC .25A
	Safety Glass	9E16	



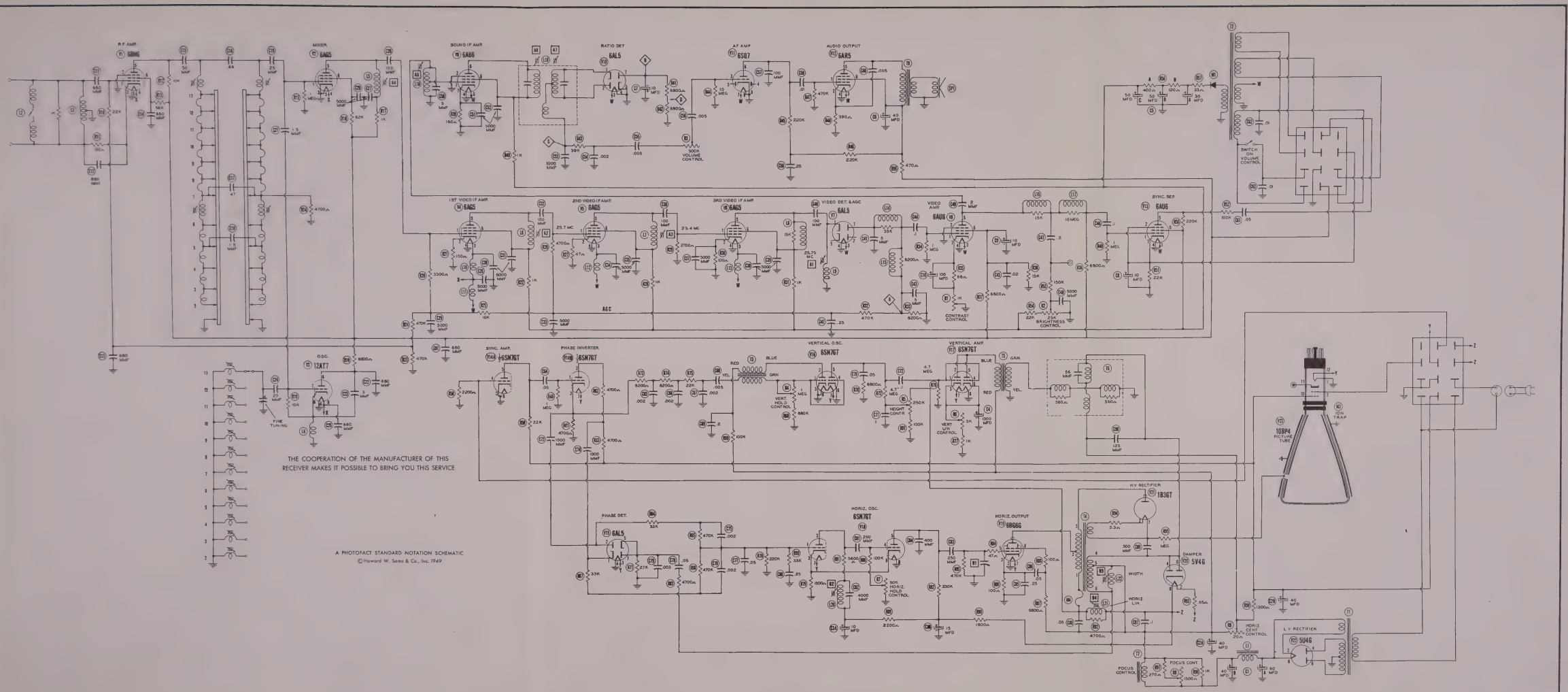
BLOCK DIAGRAM



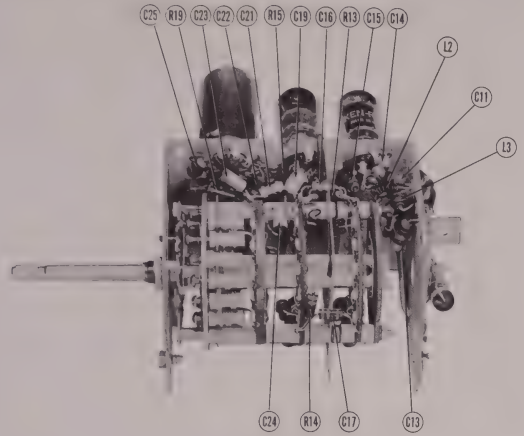
CABINET-REAR VIEW

HORIZONTAL SWEEP ADJUSTMENTS

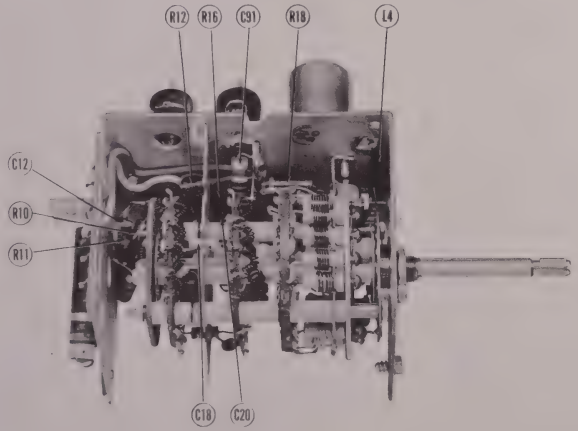
1. Turn the horizontal drive adjustment (B1) clockwise as far as possible without crowding the right hand side of the test pattern. Insufficient horizontal drive will cause the raster to fall short of filling the mask horizontally. If it is not possible to "hold" the test pattern horizontally by adjustment of the horizontal hold control, set the horizontal hold control at the mid point of its rotation and adjust the horizontal oscillator adjustment slug (B2) until picture "syncs" horizontally.
2. Adjust the horizontal centering control and the width adjustment (B3) until the test pattern fills the mask properly in the horizontal plane.
3. Set the horizontal linearity adjustment (B4) so the test pattern is symmertrical from left to right. Slight readjustment of the horizontal drive (B1) may be necessary when making this adjustment.



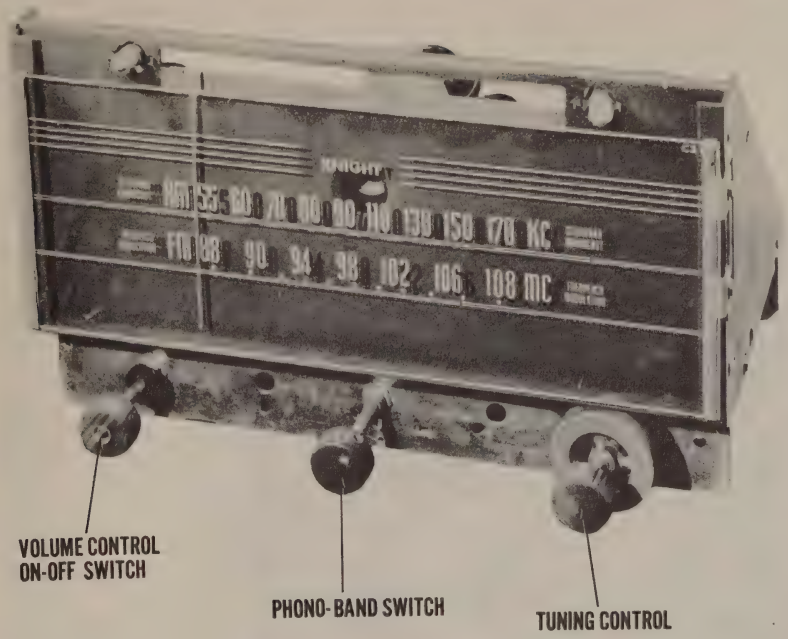
KNIGHT
MODEL 9V-101



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



KNIGHT
MODEL 97-870

KNIGHT
MODEL 97-870

KNIGHT MODEL 97-870

TRADE NAME Knight, Model 97-870

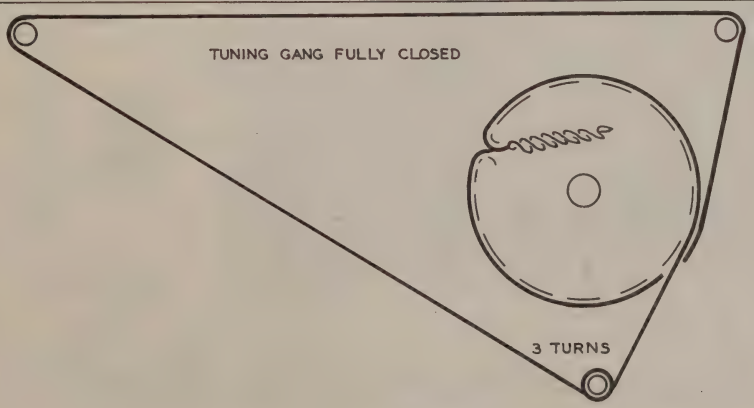
SUPPLIER Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Illinois

TYPE SET AC Operated AM-FM Superheterodyne Tuner With Power Supply.

TUBES(ELEVEN) Types 6BA6 FM RF Amp., 6BE6 FM Mixer, 6C4 FM Oscillator, 6BA6 AM RF Amp., 6BE6 AM Converter, 6SG7 1st IF Amp., 6SH7 FM 2nd IF Amp., 6AL5 Ratio Det., 6SQ7 DET-AVC-AF, 6U5 Tuning Indicator, 5Y3GT Rectifier

POWER SUPPLY 105-125 Volts AC RATING: .71 Amp. @ 117 Volts AC

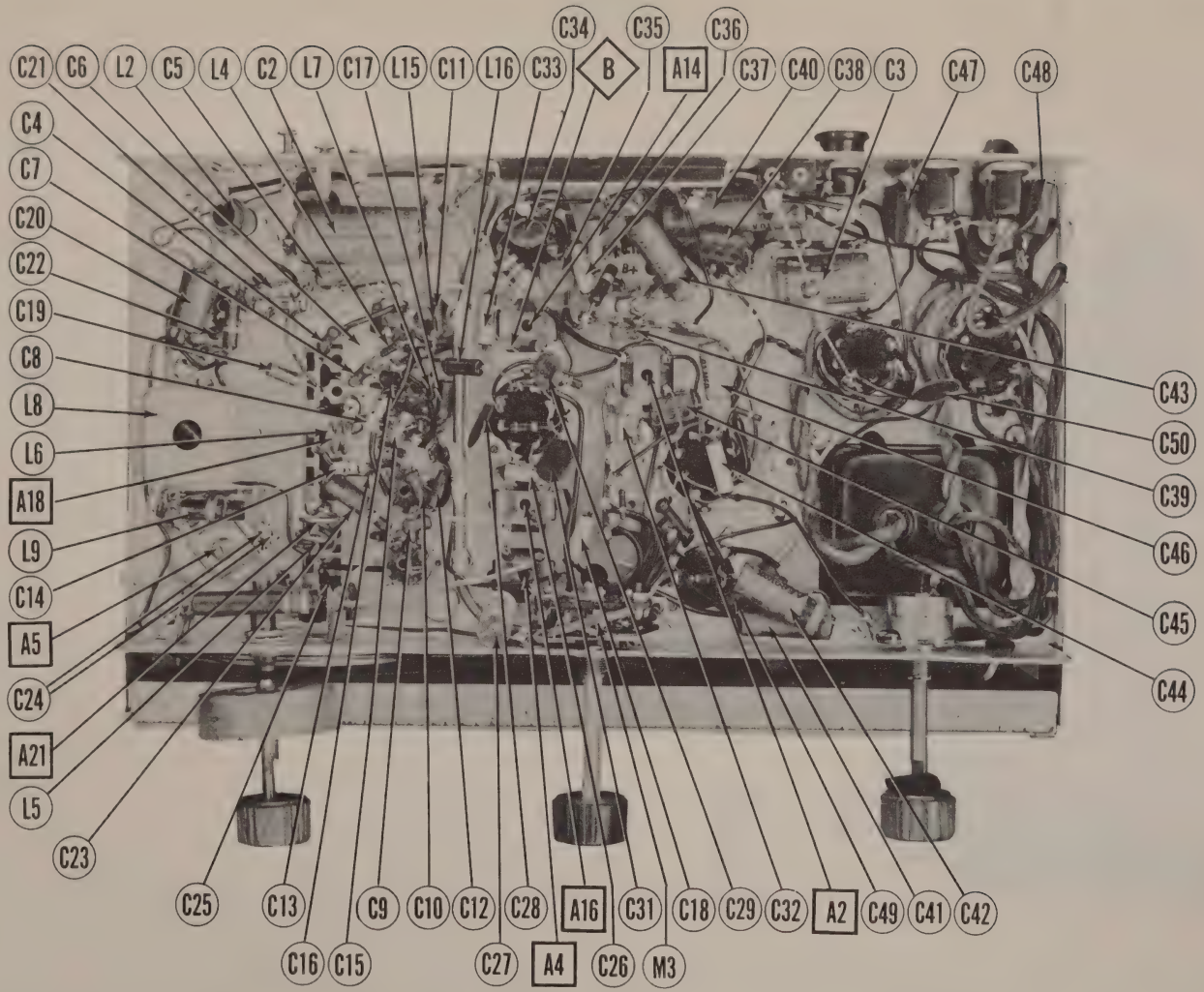
TUNING RANGE-BROADCAST 535-1720KC FREQ. MOD. 88-108MC



DIAL CORD DRIVE

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1949 by Howard W. Sams & Co., Inc., Indianapolis Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


C34
C35
C36
C21
C6
L2
C5
L4
C2
L7
C17
L15
C11
L16
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B
A14
C37
C40
C38
C3
C47
C48
C4
C7
C20
C22
C19
C8
L8
L6
A18
L9
C14
A5
C24
A21
L5
C23
C43
C50
C39
C46
C45
C44
C25
C13
C9
C10
C12
C28
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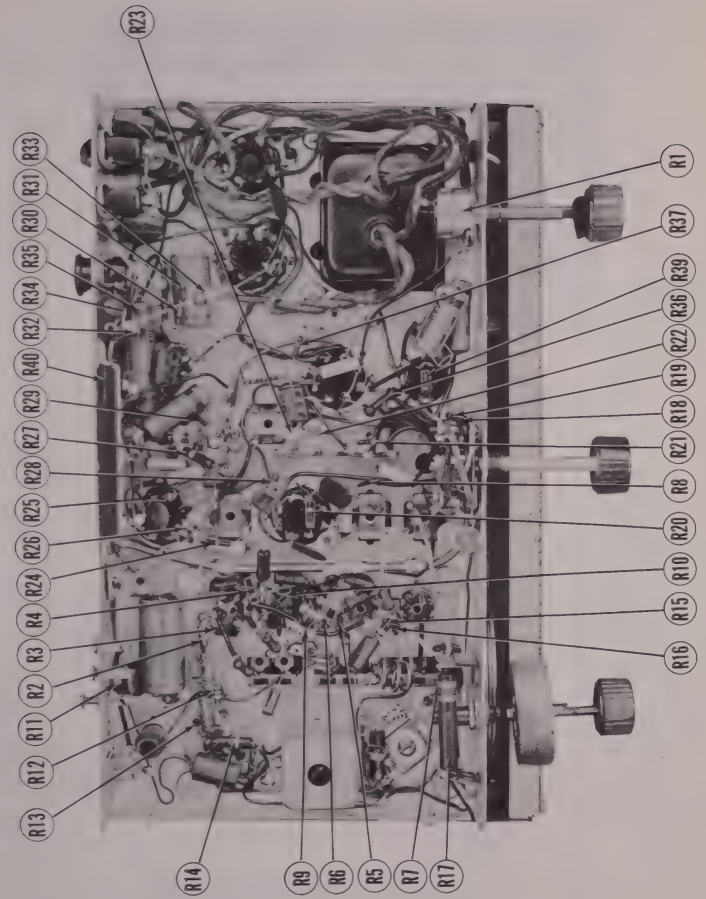
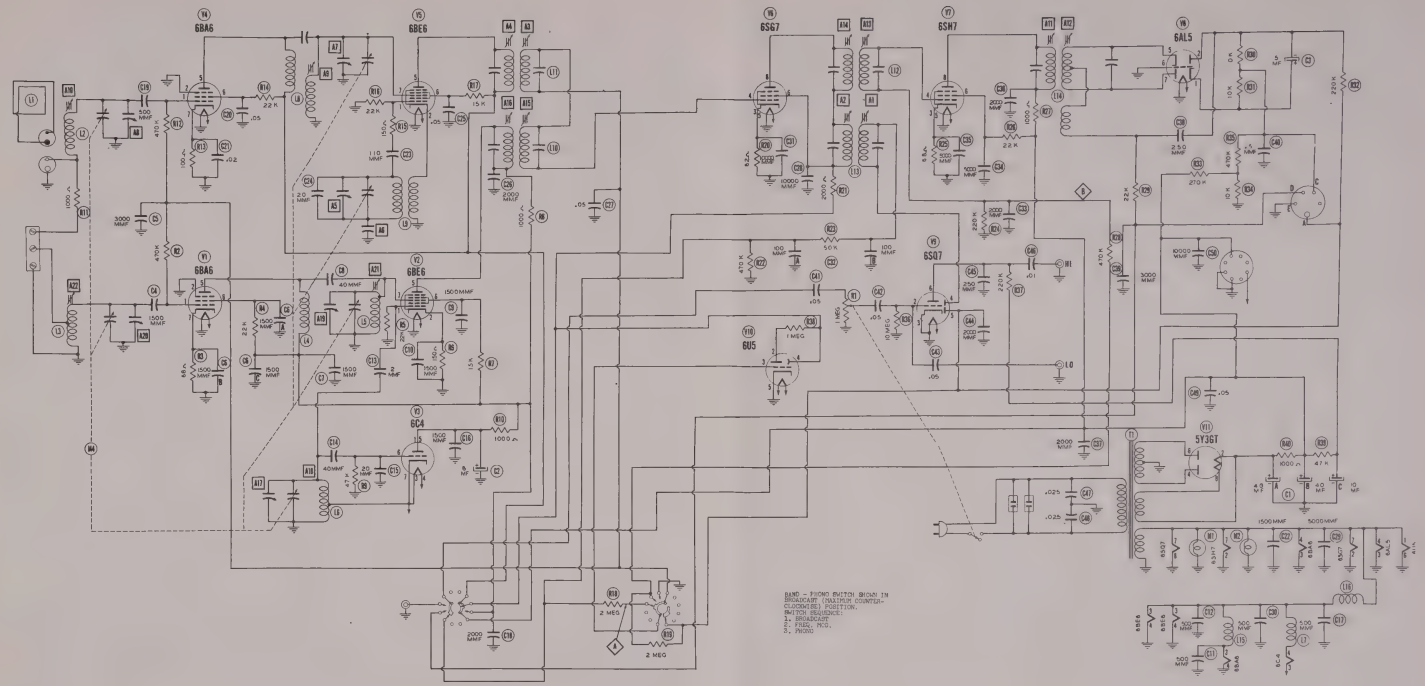
C27
A4
C26
M3





BAND – PHONO SWITCH SHOWN IN BROADCAST (MULTIPLEX COUNTER-CLOCKWISE) POSITION.
SWITCH SEQUENCE:
1. BROADCAST
2. FM-AC, PVO.
3. PHONO

IF = 455 KC AM

IF = 10.7 MC FM

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	V1	6BA6	-1.1VDC	0V	6.3VAC	0V	240VDC	105VDC	1.1VDC	
‡	V2	6BE6	-1.1VDC	1.2VDC	6.3VAC	0V	240VDC	100VDC	0V	
‡	V3	6C4	-8.4VDC	0V	6.3VAC	0V	250VDC	5.4VDC	0V	
	V4	6BA6	+.2VDC	0V	0V	6.3VAC	240VDC	105VDC	1.7VDC	
	V5	6BE6	4-6.4VDC	0V	6.3VAC	0V	250VDC	115VDC	0V	
	V6	6S67	0V	0V	1.3VDC	-.7VDC	1.3VDC	255VDC	6.3VAC	250VDC
	V7	6SH7	0V	0V	1.1VDC	.1VDC	1.1VDC	160VDC	6.3VAC	250VDC
‡	V8	6AL5	1.4VDC	1.1VDC	0V	6.3VAC	1.2VDC	0V	6.3VDC	
	V9	6SQ7	0V	-.4VDC	0V	-.9VDC	-.1VDC	100VDC	6.3VAC	0V
	V10	6U5	0V	250VDC	-.7VDC	250VDC	0V	6.3VAC		
	V11	5Y3GT	0V	360VDC	0V	330VAC	0V	330VAC	0V	360VDC

‡TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	V1	6BA6	700KΩ	0Ω	.1Ω	0Ω	110000Ω	2325Ω	99Ω	
‡	V2	6BE6	2MΩ	15Ω	.1Ω	0Ω	125Ω	11850Ω	0Ω	
‡	V3	6C4	48MΩ	Inf.	.1Ω	0Ω	125Ω	47KΩ	0Ω	
	V4	6BA6	2.4 Meg.	0Ω	0Ω	.1Ω	110000Ω	1450Ω	99Ω	
	V5	6BE6	2MΩ	1Ω	.1Ω	0Ω	110000Ω	1365Ω	0Ω	
	V6	6S67	0Ω	0Ω	0Ω	8.4 Meg.	0Ω	1.0MΩ	.1Ω	13KΩ
	V7	6SH7	0Ω	0Ω	0Ω	880KΩ	0Ω	180KΩ	.1Ω	12KΩ
‡	V8	6AL5	470KΩ	470KΩ	0Ω	.1Ω	Inf.	0Ω	Inf.	
	V9	6SQ7	0Ω	10 Meg.	0Ω	950KΩ	700Ω	1260KΩ	.1Ω	0Ω
	V10	6U5	0Ω	11 Meg.	2.2 Meg.	110000Ω	0Ω	.1Ω		
	V11	5Y3GT	0Ω	30KΩ	Inf.	132Ω	Inf.	116Ω	Inf.	36KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
† Measured from pin 6 of V11

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ITEM No.	USE	KNIGHT PART No.	STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	FM RF Amp.	6BA8	6BA6	7BK	
V2	FM Mixer	6BE8	6BE6	7CH	
V3	FM Osc.	6C4	6C4	6BG	
V4	AM RF Amp.	6BA8	6BA6	7BK	
V5	AM Converter	6BE8	6BE6	7CH	
V6	1st IF Amp.	6SH7	6SH7	8BK	
V7	FM 2nd IF Amp.	6SH7	6SH7	8BK	
V8	Ratio Det.	6AL5	6AL5	6BT	
V9	DET.-AVC-AF	6SQ7	6SQ7	6N	
V10	Tuning Indicator	6U5	6U5	6R	
V11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	N25.205	AF662J4A	CUF4445		TVL-30	■ Filter
B	40	450			CBR1045			▲ Filter
C	10	450						▲ Filter
C2	8	450		PR5450/8	BR845A		UT-8	Osc. Plate Dec.
C3	15	250	N25.206	PR5250/4	BR425		UT-42	Stabilizing Cap.
C4	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	RF Coupling
C5	3000			1467-003	1W5D3	GP2M-003	1FM-23	AVC Filter Note 1
C6A	1500		N25.211	1467-0015	1W5D15	GP2L-0015	1FM-215	FM RF Screen Bypass
B	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	FM RF Cath. Bypass
C	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C7	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass Note 2
C8	40			1468-00004	5W5D4	GP1K-39	1FM-44	RF Coupling
C9	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	Mixer Screen Bypass
C10	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	Mixer Cath. Bypass
C11	500			1468-0005	5W5T5	GP2K-500	1FM-35	FM RF Fil. Bypass
C12	500			1468-0005	5W5T5	GP2K-500	1FM-35	FM Mixer Fil. Bypass
C13	2							Osc. Coupling
C14	40			1468-00004	5W5D4	GP1K-39	1FM-44	Osc. Grid Cap.
C15	20		N25.220		5R5Q2	NP0K-20	MB-42	Osc. Feedback
C16	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	Osc. Plate Bypass
C17	500			1468-0005	5W5T5	GP2K-500	1FM-35	Filament Bypass
C18	2000			1467-002	1W5D2	GP2M-002	1FM-22	RF Bypass
C19	500			1468-0005	5W5T5	GP2K-500	1FM-35	RF Coupling
C20	.05	400		P488-05	GT4S5		TM-15	AM RF Screen Bypass
C21	.02	200		P488-02	GT2S2		TM-12	AM RF Cath. Bypass
C22	1500			1467-0015	1W5D15	GP2L-0015	1FM-215	AM RF Fil. Bypass Note 2
C23	110	500		1468-0001	5W5T1	GP1K-100	1FM-31	Osc. Grid Cap.
C24	20				5R5Q2	NP0K-20	MB-42	Fixed Trimmer
C25	.05	400		P488-05	GT4S5		TM-15	Osc. Anode Bypass
C26	2000			1467-002	1W5D2	GP2M-002	1FM-22	Mixer Plate Dec.
C27	.05	200		P288-05	GT2S5		TM-15	AVC Filter
C28	10000			P488-01	GT4S1	821-01	29C1	1st IF Decoupling
C29	5000			1467-005	1D5D5	811-005	29C1	1st IF Fil. Byp.
C30	500			1468-0005	5W5T5	GP2K-500	1FM-35	Filament Bypass
C31	10000			P488-01	GT4S1	821-01	29C1	1st IF Cath. Bypass
C32A	100			1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter Note 3
B	100			1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter Note 3
C33	2000			1467-002	1W5D2	GP2M-002	1FM-22	AVC Filter
C34	5000			1467-005	1D5D5	811-005	29C1	2nd IF Screen Bypass
C35	5000			1467-005	1D5D5	811-005	29C1	2nd IF Cath. Bypass
C36	2000			1467-002	1W5D2	GP2M-002	1FM-22	2nd IF Plate Decoup.
C37	2000			1467-002	1W5D2	GP2M-002	1FM-22	RF Bypass
C38	250	500		1468-00025	5W5T25	GP2K-250	1FM-325	Diode Load Cap.
C39	3000			1467-003	1W5D3	GP2M-003	1FM-23	De-emphasis
C40	.5	200		P289-5	GT2P5		DC-5	DAVC Decoupling
C41	.05	200		P288-05	GT2S5		TM-15	Audio Coupling
C42	.05	200		P288-05	GT2S5		TM-15	Audio Coupling
C43	.05	200		P288-05	GT2S5		TM-15	Audio Coupling
C44	2000			1467-002	1W5D2	GP2M-002	1FM-22	AVC Filter
C45	250	500		1468-00025	5W5T25	GP2K-250	1FM-325	AF Plate Bypass

Note 3. Items C32A, C32B and R23 are combined into one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C46	.01	600		P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C47	.025	400		P488-025	GT4S25		TM-13	Line Filter
C48	.025	400		P488-025	GT4S25		TM-13	Line Filter
C49	.05	400		P488-05	GT4S5		TM-15	RF Bypass Note 2
C50	10000			P488-01	GT4S1	821-01	29C1	RF Bypass Note 2

Note 1. Some models use 1500MMF in this application.
Note 2. Not used in all models.
Note 3. Items C32A, C32B and R23 are combined into one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	KNIGHT PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	A9.128	Q13-137	M-63-Z	Volume control
B	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions
R1A	500KΩ	½	N9.130	Q13-133	M-62-Z	Volume control *
B	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions

* Used in early production.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	KNIGHT PART No.	IRC PART No.	IDENTIFICATION CODES
R2	470KΩ	½		BTS-470K	FM RF Grid
R3	68Ω	½		BTS-68	FM RF Cathode
R4	22KΩ	½		BTS-22K	FM RF Screen
R5	22KΩ	½		BTS-22K	FM Mixer Grid
R6	150Ω	½			FM Mixer Cathode
R7	10KΩ	2		BT-2-15K	FM Mixer Screen
R8	1000Ω	½		BTS-1000	FM Mixer Plate Decoupling
R9	47KΩ	½		BTS-47K	FM Osc. Grid
R10	1000Ω	½		BTS-1000	FM Osc. Plate Decoupling
R11	1000Ω	½		BTS-1000	Ant. Isolation
R12	470KΩ	½		BTS-470K	AM-RF Grid
R13	100Ω	½		BW-2-100	AM RF Cathode
R14	22KΩ	1		BTA-22K	AM RF Screen
R15	150Ω	½			Parasitic Supp.
R16	22KΩ	2		BTS-22K	AM Osc. Grid
R17	15KΩ	2		BT-2-15K	AM Osc. Anode
R18	2 Meg.	½		BTS-2.2 Meg.	AVC Network
R19	2 Meg.	½		BTS-2.2 Meg.	AVC Network
R20	62Ω	½			1st IF Cathode
R21	2000Ω	½		BTS-2200	1st IF Decoupling
R22	470KΩ	½		BTS-470K	Diode Load
R23	50KΩ	½		BTS-47K	Diode Filter Note 3
R24	220KΩ	½		BTS-220K	FM 2nd IF Grid
R25	68Ω	½			FM 2nd IF Cathode
R26	22KΩ	½		BTA-22K	FM 2nd IF Screen
R27	1000Ω	½		BTS-1000	FM 2nd IF Decoupling
R28	470KΩ	½		BTS-470K	AVC Network
R29	22KΩ	½		BTS-22K	De-emphasis
R30	10KΩ	½		BTS-10K	Ratio Det. Diode Load
R31	10KΩ	½		BTS-10K	Ratio Det. Diode Load
R32	220KΩ	½		BTS-220K	AVC Network
R33	270KΩ	½		BTA-270K	Voltage Divider
R34	10KΩ	1		BTA-10K	Voltage Divider
R35	470KΩ	½		BTS-470K	Delayed AVC Network
R36	1. Meg.	½		BTS-10 Meg.	AF Grid
R37	2200Ω	½		BTS-220K	A3 Plate
R38	1 Meg.	½		BTS-1 Meg.	Tuning Indicator Plate
R39	47KΩ	½		BTS-47K	Filter
R40	10000Ω	15	N14.007	DO-1000	Filter (Wire Wound)

Note 3. Items C32A, C32B and R23 are combined into one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	KNIGHT PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	610VCT	5VAC	6.3VAC	B18.078	P-6012 ▲	P-2952 ▲	PH-60 ▲
	⑤ .71A	.085ADC	③ 2A	⑤ 3.2A				

▲ Add series resistor to reduce plate voltage.

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	KNIGHT PART No.	MEISSNER PART No.	
L1	AM Loop Ant.	.82		C5.027		
L2	AM Ant. Loading	1.5Ω		B2.423		
L3	FM Ant.Coil	0Ω		N2.411		
L4	RF Choke	1Ω		A2.402		Inductance-3 microhenries
L5	FM RF	0Ω		N2.412		
L6	FM Osc.	0Ω		N2.413		
L7	Fil.Choke	.22		N2.416		
L8	AM RF	90Ω	3.42	B2.409		
L9	AM Osc.	.82		A2.410	14-1060	
L10	1st FM IF	.82	.82	N2.415		
L11	1st AM IF	10Ω	10Ω	N2.414	16-6678	
L12	2nd FM IF	.82	.82	N2.415		
L13	2nd AM IF	10Ω	10Ω	N2.414	16-6678	
L14	Ratio Det. Transformer	.82	.22	C2.278		
L15	Fil.Choke	.22		N2.416		
L16	Fil.Choke	.22		N2.459		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	KNIGHT PART No.	NOTES
M1	Bayonet	6-8	.15	Brown	112301	Type #47
M2	Bayonet	6-8	.15	Brown	112301	Type #47

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M3	Switch	A12.108	Band-Phono
M4	3 Gang Var. Cap.	B8.079	(40-537MMF, 40-533MMF, 24-517MMF)
A17	Trimmer	N20.022	FM Osc. Adj.
A19	Trimmer	N20.022	FM RF Adj.

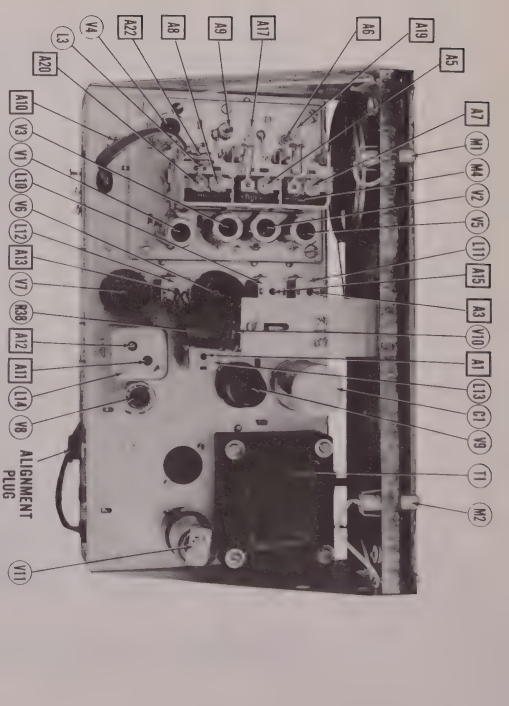


FIG. 2

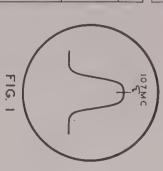


FIG. 1

ALIGNMENT INSTRUCTIONS-READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Line cord should be plugged in. Set the gang fully closed and set the pointer to the small white line above the left end of the dial.

AM ALIGNMENT

Loop should be mounted in same relative position to chassis as when permanently installed. A VTVM connected to read the AVC voltage is used as an indicator. Do not attempt to use any other type of voltmeter for this purpose.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
DUMMY ANTENNA	Thru .1 mfd. to Loop.	1620 KC.	Broadcast	1620 KC.	Across AVC & Bottom Screen Bypass Capacitor	A9,A10	Adjust for maximum deflection. Repeat steps 1 & 2.
"	"	1400 KC.	"	1400 KC.	"	A7,A8	Adjust for maximum deflection.
"	"	600 KC.	"	600 KC.	"	A5,A6	Adjust for maximum deflection. Repeat steps 4 & 5.
"	"	1400 KC.	"	1400 KC.	"	A7,A8	Adjust for maximum deflection. Repeat steps 3 & 4.
"	"	600 KC.	"	600 KC.	"	A5,A6	Adjust for maximum deflection. Repeat steps 4 & 5.
"	"	1620 KC.	"	1620 KC.	"	A9,A10	Adjust for maximum deflection. Repeat steps 3 & 4.
"	"	1400 KC.	"	1400 KC.	"	A7,A8	Adjust for maximum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

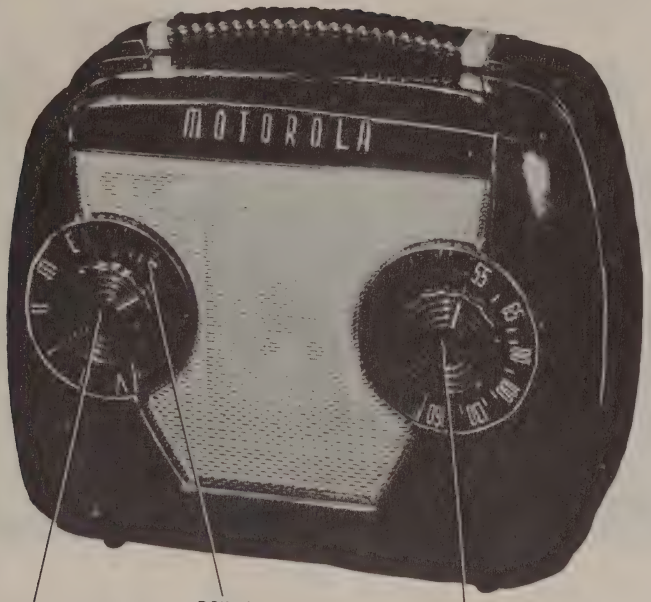
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
DUMMY ANTENNA	Thru .1 mfd. to Loop.	1620 KC.	Broadcast	1620 KC.	Across AVC & Bottom Screen Bypass Capacitor	A9,A10	Adjust for maximum deflection.
"	"	1400 KC.	"	1400 KC.	"	A7,A8	Adjust for maximum deflection.
"	"	600 KC.	"	600 KC.	"	A5,A6	Adjust for maximum deflection. Repeat steps 1 & 2.
"	"	1400 KC.	"	1400 KC.	"	A7,A8	Adjust for maximum deflection. Repeat steps 3 & 4.
"	"	600 KC.	"	600 KC.	"	A5,A6	Adjust for maximum deflection. Repeat steps 4 & 5.
"	"	1620 KC.	"	1620 KC.	"	A9,A10	Adjust for maximum deflection.

FM RF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120V. sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
DUMMY ANTENNA	Thru .1 mfd. to Loop.	98 MC. (Harmonic)	FM	Center of Dial Space	Across AVC & Bottom Screen Bypass Capacitor	A13,A14	Adjust for maximum amplitude and symmetry as per Fig. 1.
"	"	98 MC. (Harmonic)	"	Center of Dial Space	Across AVC & Bottom Screen Bypass Capacitor	A13,A14	Adjust All on 10.7MC occurs at center of response curve as per Fig. 2. Adjust A12 for minimum phase distortion. Check for cross-over lines. Continue with Step 10.
"	"	88 MC. (Harmonic)	"	Center of Dial Space	Across AVC & Bottom Screen Bypass Capacitor	A13,A14	Adjust for zero reading. A reading will be obtained on either side of the correct setting.
"	"	98 MC. (Harmonic)	"	Center of Dial Space	Across AVC & Bottom Screen Bypass Capacitor	A13,A14	Adjust for maximum deflection.
"	"	98 MC. (Harmonic)	"	Center of Dial Space	Across AVC & Bottom Screen Bypass Capacitor	A13,A14	Adjust for maximum deflection.

MOTOROLA MODELS 59L11Q, 59L12Q, 59L14Q, (Ch. HS-187) (BATTERY-LINE OPERATED)



MOTOROLA MODEL 59L12Q

TRADE NAME	Motorola, Models 59L11Q, 59L12Q, 59L14Q (Ch. HS-187)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Illinois
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types 1R5 Converter, 1U4 IF Amp., 1U5 DET-AVC-AF, 3S4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 3 Volt "A" Supply and 67.5 Volts "B" Supply.
RATING:	.12 Amp. @ 117 Volts AC or 155MA @ 3 Volts DC and 8MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to stator of antenna section of tuning gang. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully closed	Across voice coil	A1,A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy antenna to 200MMF to reduce modulation.
2.	.1MFD	"	1620KC (400~ Mod.)	Tuning gang fully open	"	A4	"
3.		Loop	"	"	"	A5	Install set in cabinet. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. A5 is reached thru a hole in the bottom of the cabinet.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL 59L12Q

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amp.	1U4	1U4	6AR	
V3	DET-AVC-AF	1U5	1U5	6BW	
V4	Power Output	3B4	3B4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	150	23A680014	PRS150/40-40	EDL4415		ELS-7 †	Filter-Red
B	40	150		PRS12/250	BRH1225		TVA-3	Filter-Blue
C	250	10						Filament Bypass Orange
C2	.05	100	8A71213	P285-05	ZYW1S5		68P16	AVC Filter
C3	.02	100	8K471628	P285-02	ZYW1S3		68P15	Osc. Anode Bypass
C4	.02	100	8K471628	P285-02	ZYW1S3		68P15	RF Bypass
C5	50		21K77373	1468-00005	5W5Q5	GP1K-50	1FM-35	IF Coupling
C6	.05	100	8A71213	P285-05	ZYW1S3		68P16	Filament Bypass
C7	100		21B77286	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C8	.006	100	8C4529	P285-006	ZZW1D6	GP2M-0056	68P12	Audio Coupling
C9	100		21B77286	1468-0001		GP1K-100	1FM-31	AF Plate Bypass
C10	.02	100	8K471628	P285-02	ZYW1S3		68P15	AF Screen Bypass
C11	.006	100	8C4529	P285-006	ZZW1D6	GP2M-0056	68P12	Audio Coupling
C12	.006	100	8C4529	P285-006	ZZW1D6	GP2M-0056	68P12	Output Plate Bypass
C13	.05	400	8K14791	P485-05	GT4S5		68P10	Line Filter

† Use mounting strap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	18K680375			Volume control & power change-over switch #
B	1 Meg.	½	18A480049			Volume control & power change-over switch *

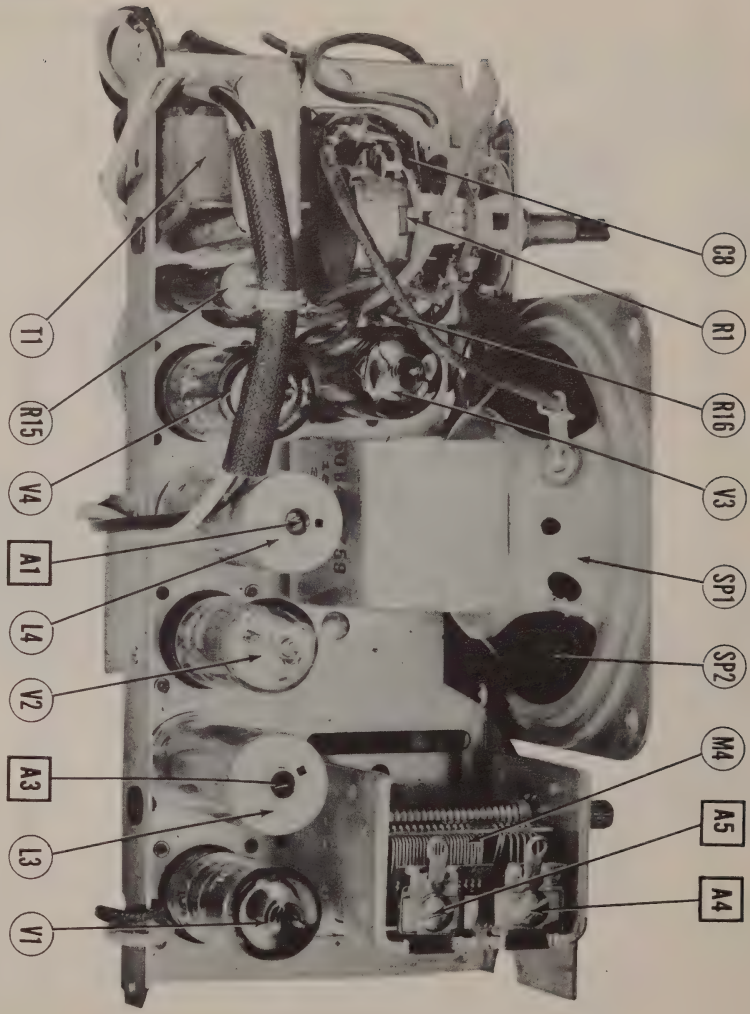
* Used when R1B is in series with volume control.
# This control has 40KΩ fixed stop between center and right hand terminals.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R2	100KΩ	½	6R6031	BTS-100K	Osc. Grid
R3	22KΩ	½	6R6397	BTS-22K	Osc. Anode Decoupling
R4	10 Meg.	½	6R2109	BTS-10 Meg.	IF Grid
R5	27Ω	½	6R5683	BW-½-27	Filament String
R6	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	AVC Network
R7	10 Meg.	½	6R2109	BTS-10 Meg.	AF Grid
R8	390Ω	½	6R5554	BW-½-390	Filament String
R9	4.7 Meg.	½	6R2122	BTS-4.7 Meg.	AF Screen
R10	1 Meg.	½	6R6004	BTS-1 Meg.	AF Plate
R11	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Output Grid
R12	270Ω	½	6R6432	BW-½-270	Filament String
R13	68Ω	½	6R6040	BTS-680	Filament String
R14	820Ω	½	6R6289	BTS-820	Bias Network
R15	2000Ω	5	17K680015		Filter (Wire Wound) Center Tapped
R16	3300Ω	½	6R5581	BTS-3300	Filter
R17	150Ω	2½	17A76986		Surge Limiter (Wire Wound)
R18	33KΩ	½	6R6410	BTS-33K	Series Volume Control See Note 1

Note 1. Used only when R1B is used.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	6500Ω	3.1Ω	360Ω	.4Ω	25B470622	A-3329 ‡	A-2927‡	RO-11 ‡	‡ Bend mounting tabs down and mount on chassis.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.				
SP1	PM	3.1Ω	50B482759		3A07	
	CONE DIA.	V. C. DIA.				
SP2	3 1/4"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
L1	Loop Ant.	3Ω		24B480092		Includes panel
L2	Osc. Coil	3Ω	13Ω	24A485989		
L3	Input IF	27Ω	27Ω	24B690840		Alt. Pt. #24B480042
L4	Output IF	2Ω	50Ω	24B480040		Complete except shield.

BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1.5V"A"		950			2R			2 used in series.
M2	67.5V"B"			467			XX45		

SELENIUM RECTIFIER

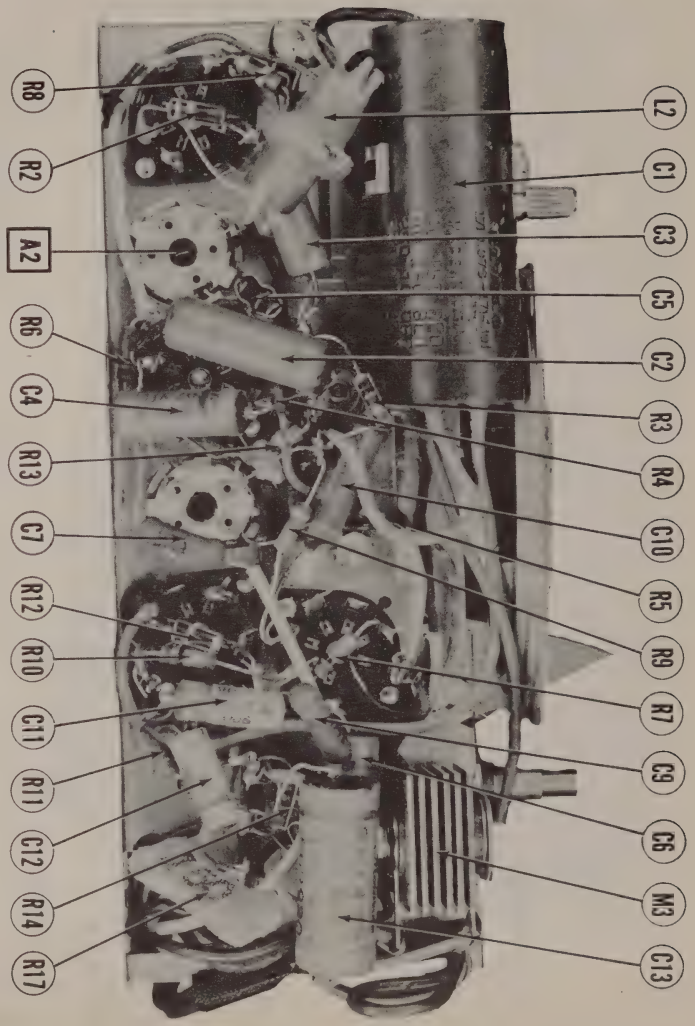
ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	MOTOROLA PART No.	SYLVANIA PART No.		
M3	.160A	48B478111			

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	2 Gang Var. Cap.	19K680360	(28-433MMF, 16-105MMF)
	Cabinet	1X690082	Model 59L11Q
	Cabinet	1X690484	Model 59L12Q
	Cabinet	1X690151	Model 59L14Q

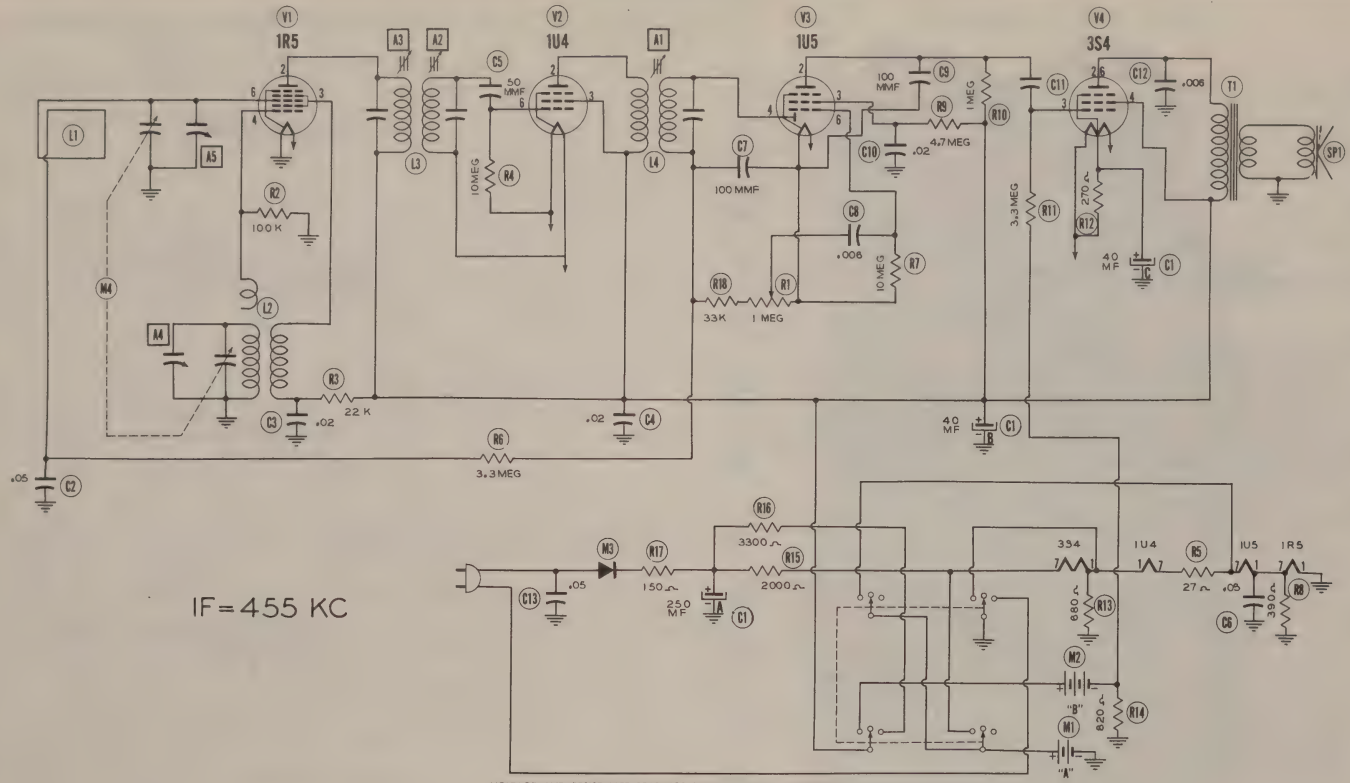
DATE 11/49 SET #76 FOLDER 10

CHASSIS—BOTTOM VIEW



MOTOROLA MODEL 59L12Q

MOTOROLA MODEL 59L12Q



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	0V	65VDC	35VDC	$-2.4VDC	0V	.1VDC	1.1VDC
V 2	1U4	5.3VDC	65VDC	65VDC	0V	5.3VDC	.1VDC	3.6VDC
V 3	1U5	1.1VDC	15VDC	15VDC	.1VDC	0V	0V	2.4VDC
V 4	3S4	5.3VDC	63VDC	0V	65VDC	6.6VDC	63VDC	7.8VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†3.4KΩ	†25KΩ	100KΩ	*	4.5 Meg.	*
V 2	1U4	*	†3.4KΩ	†3.4KΩ	4.5 Meg.	*	10 Meg.	*
V 3	1U5	*	11 Meg.	†4.7 Meg.	1.4 Meg.	Inf.	10 Meg.	*
V 4	3S4	*	†4KΩ	3.4Meg.	†3.4KΩ	*	†4KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† Measured from output of M3.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODELS
50-522, 50-522-I, 50-524

PHILCO MODELS
50-522, 50-522-I, 50-524

PHILCO MODEL 50-522

TRADE NAME	Philco, Models 50-522, 50-522-I, 50-524
MANUFACTURER	Philco Corp., Tioga and "C" Sts., Philadelphia, Pennsylvania
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 7A8 Converter, 12BA6 IF Amp., 14B6 DET-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC-DC RATING: .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning gang fully closed and set the pointer to the last calibration indent mark at the left hand end of the dial backplate.

Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (Grid) of 7A8 (V1). Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully closed	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1600KC (400~ Mod.)	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1500KC (400~ Mod.)	1500KC	"	A6	"

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DATE 11/49 SET #78 FOLDER 11

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	7A8	7A8	8V	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	DET.-AVC-AF	14B6	14B6	8W	
V4	Power Output	50L6GT	50L6GT	7AC	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	150	30-2573	PRSA864D	EDL32V215		TA-303	Filter-Orange
B	25	150						Filter-Blue
C	20	150						Filter-Red
C2	47	500	60-00515307	1468-00005	5W5Q5	GP1K-47	1FM-45	Osc. Grid Cap.
C3	10		30-1224-26	1469-00001	5R5Q1	NPOK-10	MS-41	Fixed Trimmer
C4	.003	600	61-0109	P688-003	GT6D3	GP2M-003	TM-23	Decoupling
C5	.05	400	61-0122	P488-05	GT4S5		TM-15	AVC Filter
C6	.01	400	61-0120	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C7	.01	400	61-0120	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C8	220		62-12200100	1468-00025	5W5T25	GP2K-220	1FM-325	Output Grid Bypass
C9	.02	400	61-0108	P488-02	GT4S2		TM-12	Output Plate Bypass
C10	.1	400	61-0113	P488-1	GT4F1		72P62	Line Isolation
C11	.04	400	45-3500-2	P488-04	GT6S4		TM-14	Line Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	500KΩ	½	33-5566-4	Q13-133	M-60-Z	Volume control
B	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions

RESISTORS

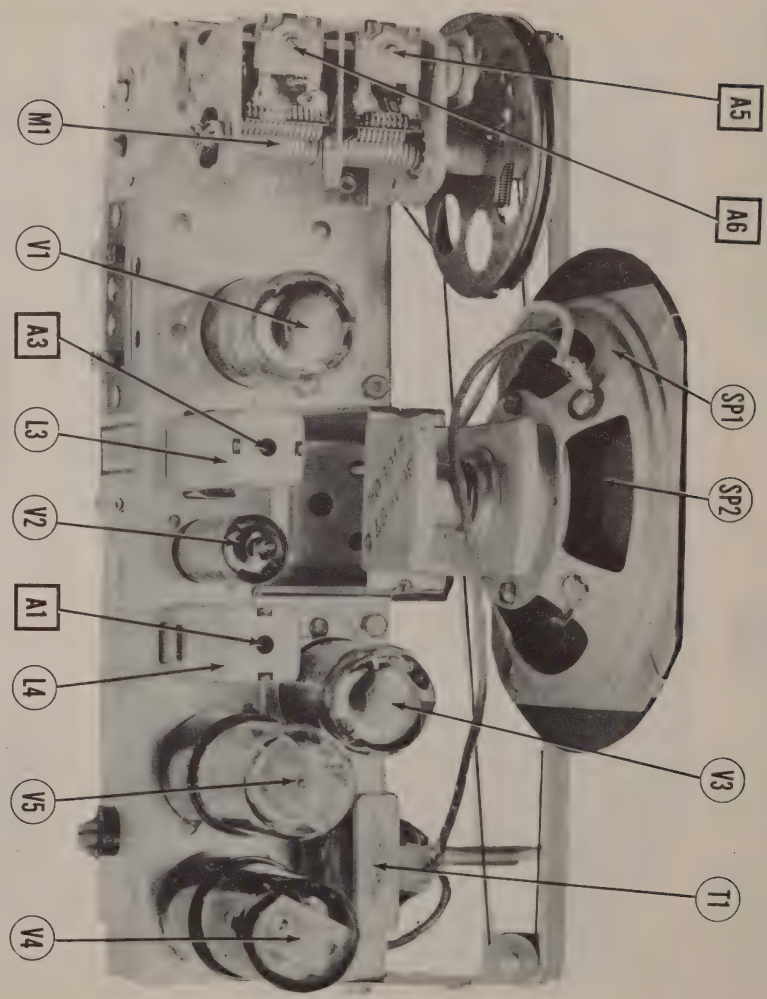
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
R2	100KΩ	½	66-4108340	BTS-100K	Osc. Grid
R3	470KΩ	½	66-4478340	BTS-470K	IF Grid See Note 1
R4	39KΩ	½	66-3398340	BTS-39K	Screen Dropping
R5	47KΩ	½	66-3478340	BTS-47K	Diode Filter
R6	2.2 Meg.	½	66-5228340	BTS-2.2 Meg.	AVC Network
R7	3.3 Meg.	½	66-5338340	BTS-3.3 Meg.	AF Grid
R8	470KΩ	½	66-4478340	BTS-470K	AF Plate
R9	1 Meg.	½	66-5108340	BTS-1 Meg.	Diode Load See Note 2
R10	470KΩ	½	66-4478340	BTS-470K	Output Grid
R11	130Ω	½	66-1134340	BW-½-120	Output Cathode (Wire Wound)
R12	1200Ω	½	66-2128340	BTS-1200	Filter
R13	220Ω	1	66-1224340	BW-1-220	Filter (Wire Wound)
R14	150KΩ	½	66-4158340	BTS-150K	Isolation

Note 1. Some models use 330KΩ resistor in this application.
Note 2. Not used in all models.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	2500Ω	3.5Ω	200Ω	.72	32-8384	A-3332	A-3025	RO-2*	* Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

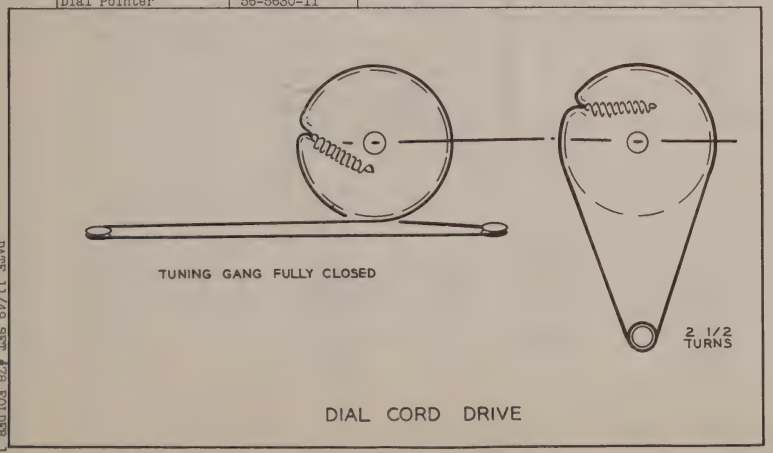
ITEM No.	RATINGS		REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-113 †		
SP1	PM	3.5Ω	36-1627-5	MOD.P4-X	4A1	† Drill and tap magnet frame.
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA MEISSNER PART No.	
L1A	Loop Ant.	3.1		32-4052-31		Models 50-522, 50-522-I
B	Loop Ant.			32-4052-34		Model 50-524
L2	Osc. Coil	2Ω	6.5Ω	32-4263		
L3	Input IF	23Ω	23Ω	32-4160-8A	16-6678	
L4	Output IF	16Ω	16Ω	32-4240-A	16-6678	

MISCELLANEOUS

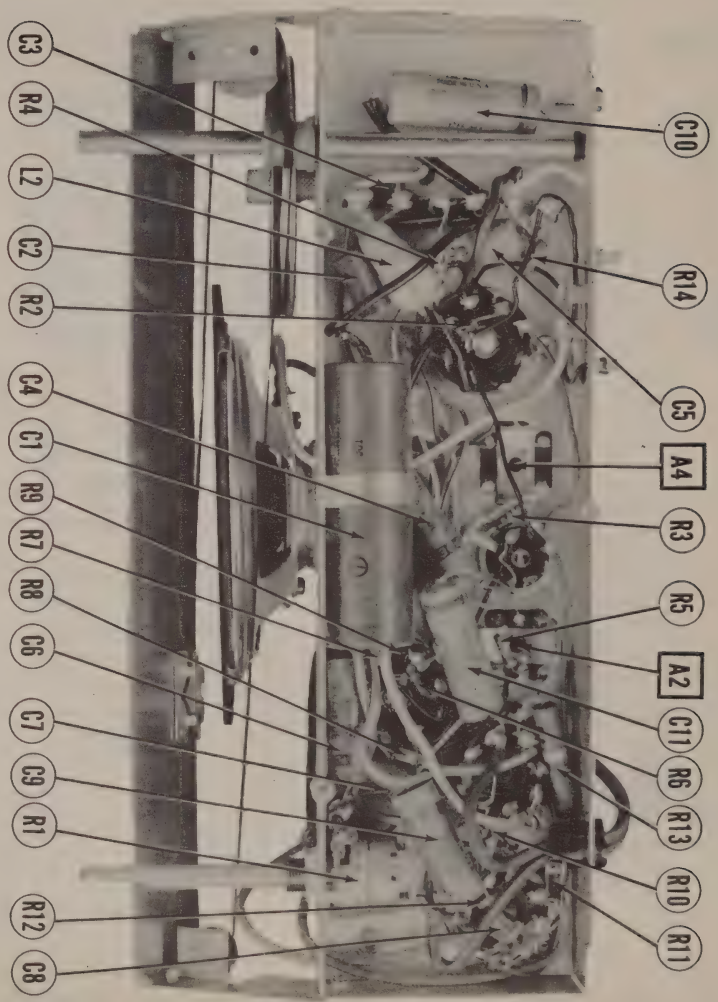
ITEM No.	PART NAME	PHILCO PART No.	NOTES
M1	2 Gang Var. Cap.	31-2727-2	(27-496MMF, 24-165MMF)
	Cabinet	10747	Model 50-522
	Cabinet	10747-1	Model 50-522-I
	Cabinet	10754	Model 50-524
	Dial Scale	54-5060	Model 50-524
	Knob	54-4674	Model 50-522
	Knob	54-4674-1	Model 50-522-I
	Knob	54-4527-3	Model 50-524
	Dial Pointer	56-5630-11	



DIAL CORD DRIVE

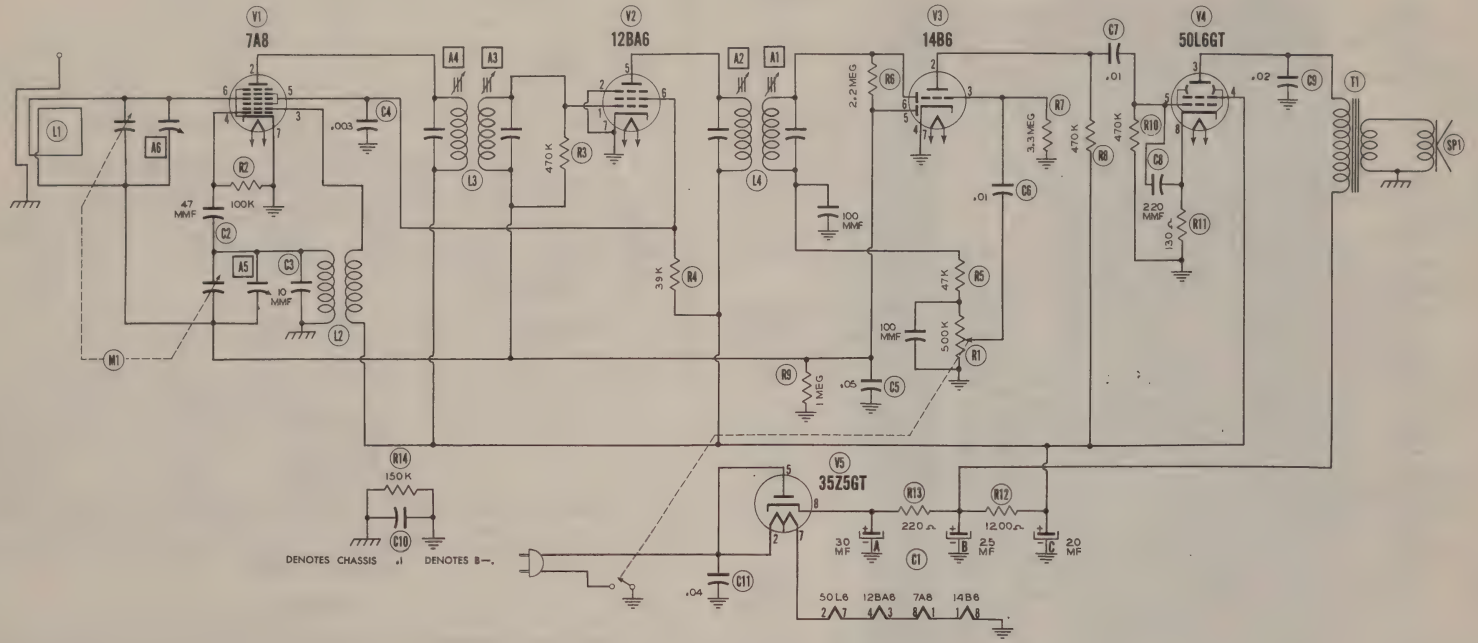
DATE 11/49 SET # 7% FOLDER 11

CHASSIS—BOTTOM VIEW



PHILCO MODEL 50-522

PHILCO MODEL 50-522



IF = 455 KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	7A8	13VAC	107VDC	107VDC	§-8VDC	37VDC	-.7VDC	0V	20VAC
V 2	12BA6	-.7VDC	0V	20VAC	32VAC	107VAC	37VAC	0V	
V 3	14B6	13VAC	50VDC	-.6VDC	0V	-.7VDC	-.7VDC	0V	0V
V 4	50L6GT	0V	83VAC	110VDC	107VDC	0V	120VDC	32VAC	6.2VDC
V 5	35Z5GT	0V	117VAC	110VAC	107VDC	117VAC	120VDC	83VAC	132VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	7A8	13Ω	†1.5KΩ	†1.5KΩ	100KΩ	†40KΩ	700KΩ	0Ω	20Ω
V 2	12BA6	700KΩ	0Ω	20Ω	32Ω	†1.5KΩ	†40KΩ	0Ω	
V 3	14B6	13Ω	†470KΩ	3.3 Meg.	0Ω	700KΩ	500KΩ	0Ω	0Ω
V 4	50L6GT	Inf.	80Ω	†410Ω	†1.5KΩ	470KΩ	†220Ω	32Ω	130Ω
V 5	35Z5GT	0Ω	112Ω	105Ω	40KΩ	112Ω	40KΩ	80Ω	50KΩ

† Measured from pin 8 of V5

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FIG. 1—MODEL "S"

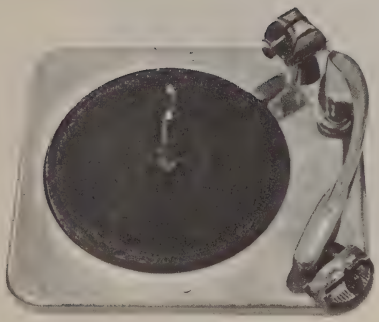

FIG. 2—MODEL "SQ"

SEEBURG
MODELS "S" AND "SQ"

GENERAL INFORMATION

This changer is of a single-post, automatic type. It is designed to play ten 12-inch or twelve 10-inch records, not intermixed. The changer will shut off automatically at the completion of the last record. Manual operation is provided for playing non-standard and home recordings. The models "S" and "SQ" are mechanically the same . . . the only variation being the shape of the baseplates.

Manufactured by: **J. P. SEEBURG CORPORATION**
1500-24 Dayton Street • Chicago 22, Illinois

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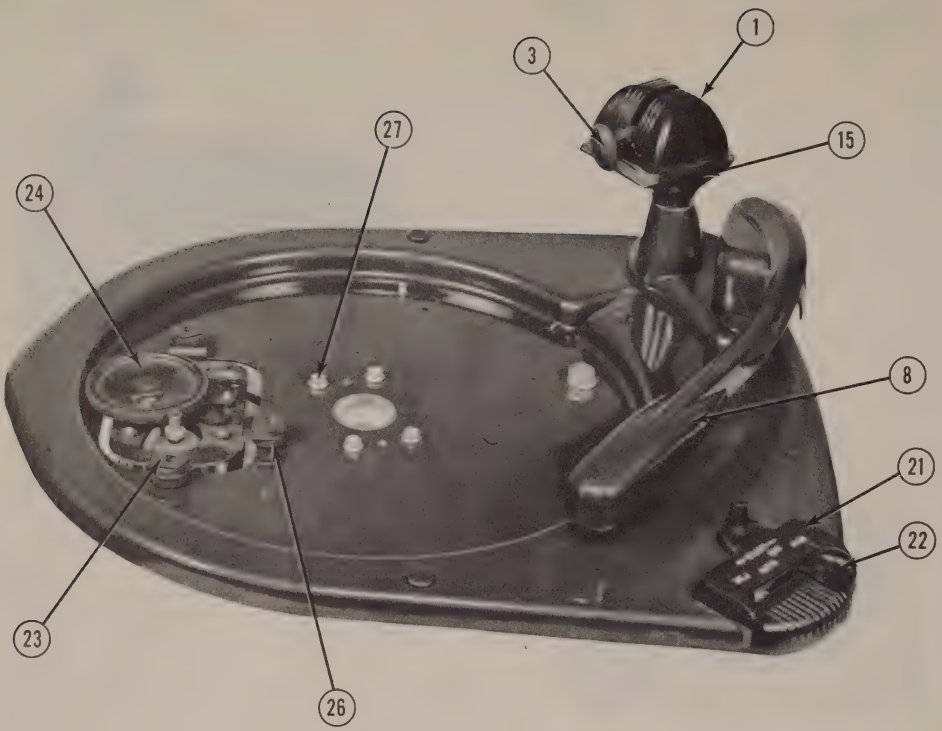

FIG. 3—TOP VIEW LESS TURNTABLE

MANUAL OPERATION

Odd-size, or very old records, and home recordings, should be played manually:

1. Turn the record selector post to the twelve-inch position.
2. Place a record on the turntable by moving it past the shelf on the spindle.
3. Move control knob to "manual" position.
4. Place the tone arm on the record.
5. When the record has finished playing, the tone arm may be returned to its rest position, by hand.
6. To stop the changer, move the control knob to "off" position.

Placing the control knob in "manual" position moves the arm (40) into position near the clutch engagement lever (62), preventing this lever from starting the change cycle.

AUTOMATIC OPERATION

1. Turn the selector post for the correct size record.
2. Load changer with twelve 10-inch or ten 12-inch records. Do not intermix sizes.
3. Move the record stabilizer forward so that it rests on the edge of the top record.
4. Move control knob to "reject" position and then release it. The control knob will return to "Auto." position. The changer will now play the entire stack and shut off automatically after the last record has been played.
5. To reject any record, move the control knob to "reject" and release it.
6. To unload records, turn record selector post to twelve-inch position and lift records from turntable.

THE CHANGE CYCLE

As the control knob (22) moves from "off" past "auto.," the switch is turned on starting the motor and turntable. As the control knob reaches "reject," the changer is tripped as follows: The control-arm assembly of the control slide (40) pushes the clutch engagement lever (62) past the stud of the trip lever (59), allowing it to fall.

The lug on the rotating pinion gear (65) strikes the clutch engagement lever (62), causing the drive gear (79) to rotate and mesh with the pinion gear.

The lift pin (14) rides up the inclined portion of the drive gear, raising the tone arm from its rest.

The top cam of the drive gear pushes the ejector drive slide (39) back, which, in turn, causes the ejector drive link assembly (43) to rotate a quarter of a turn. This motion turns the eccentric pin on the ejector drive shaft (6), causing the record ejector

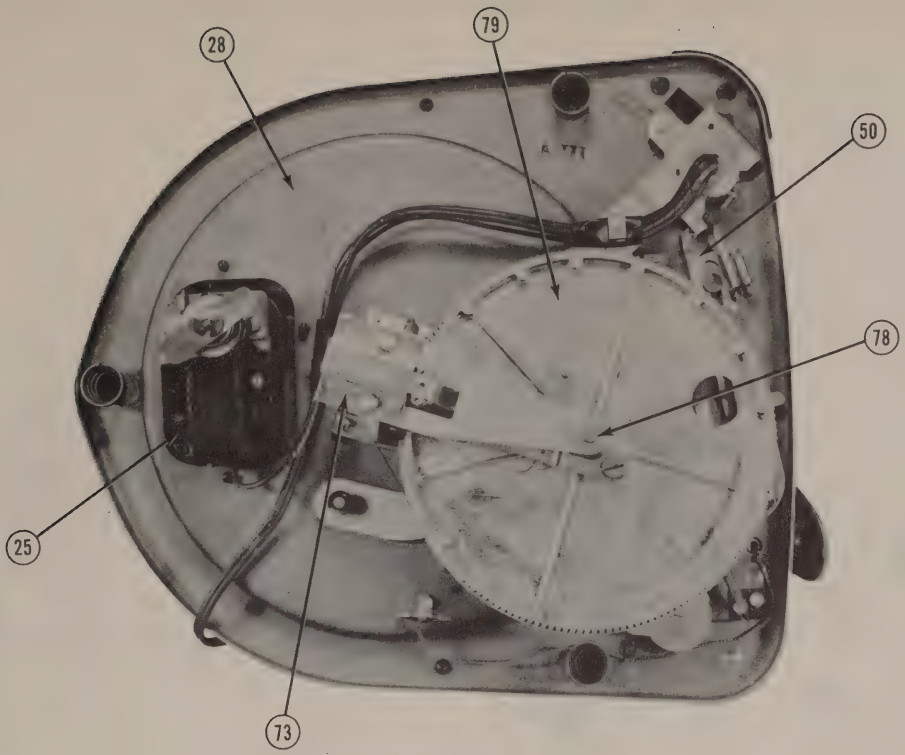

FIG. 4—BOTTOM VIEW

blade (5) to slide out pushing a record from the shelf on the spindle.

The clutch engagement lever (62) comes in contact with the inner surface of the tone arm lever (54), thereby resetting the trip by latching the clutch engagement lever (62) to the trip lever (59).

The drive gear cam surface (H) contacts the stud (G) of the tone arm lever (54), which moves the tone arm locator (53) out away from the drive gear. This allows the manual outer slide (50) to slip by the stud on the tone arm locator (53) by the action of spring (48); therefore, stud (G) of the tone arm lever follows the receding cam surface (H) by means of the tone arm locator (53) pushing against the tone arm lever (54), through action of the tone arm locator spring (51). Thus, the tone arm lever and the tone arm are moved in toward the record.

The position of the record selector post in the 10 or 12-inch position determines the point at which the locator slide (36) contacts the tone arm locator (53), which positions the tone arm for set-down.

As the stud (G) of the tone arm lever (54) leaves cam (H) of the drive gear, it contacts the tone arm retard lever (56) which holds the tone arm lever (54) and tone arm in position during the time of lowering the tone arm to the record. The lift pin (14) rides down the incline and lowers the tone arm to the record. The tone arm locator spring (51) causes the tone arm locator (53) to exert enough pressure against the tone arm lever (54) to force the needle into the starting groove.

The retard lever (56) leaves the stud (G) of the tone arm lever (54), giving the tone arm free movement on the record.

The drive gear (79) now completes its rotation and is locked in open-toothed position by the stop spring (63) sliding into the detent of the cam surface (E) of the drive gear.

AUTOMATIC SHUT OFF

The automatic shut off is controlled by the spindle and the shut-off lever (74). When there is a record on the spindle shelf, the shut-off lever (74) is depressed and will clear the shut-off pawl lever (80); therefore, the shut-off mechanism is not actuated.

With the absence of a record on the spindle shelf, the shut-off lever (74) will engage the shut-off pawl lever (80), disengaging the pawl lever from the shut-off pawl (60), allowing it to drop out toward the outer circumference of the drive gear (79) by action of the pawl spring (82). After the last record has finished playing, the main gear is put in motion by the automatic tripping.

A PHOTOFACT "EXPLODED" VIEW

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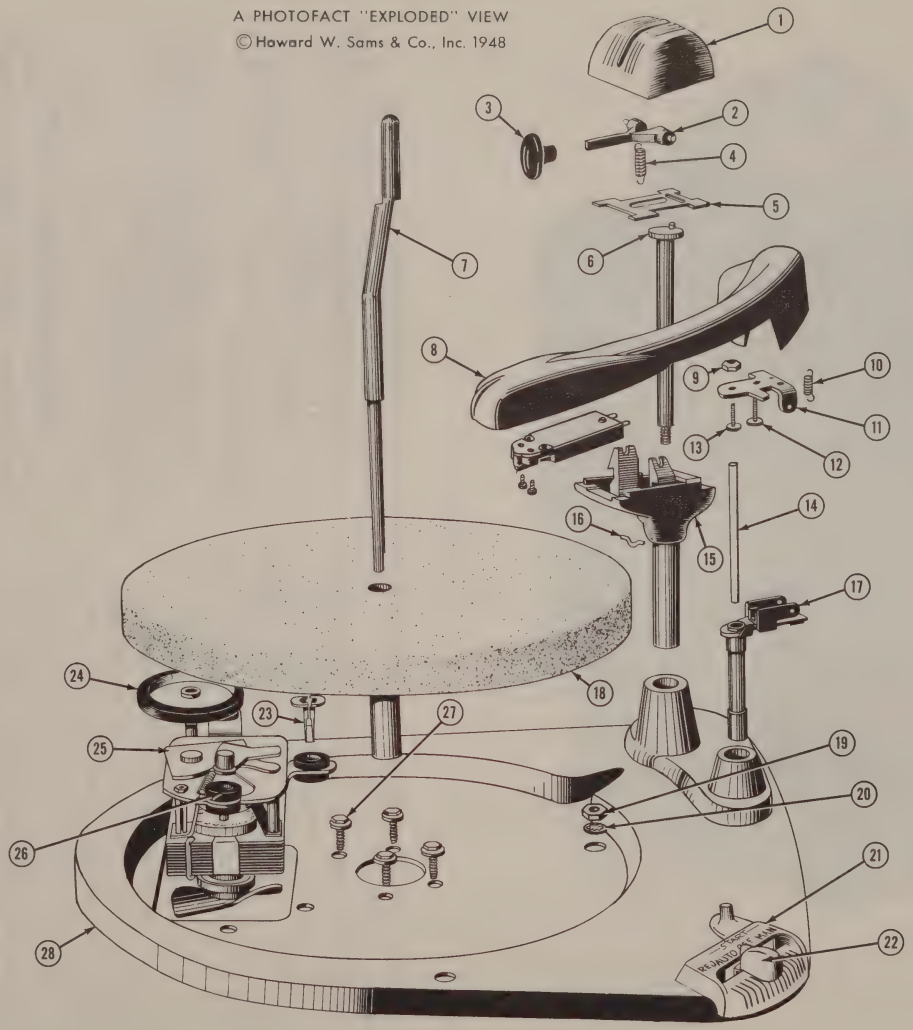

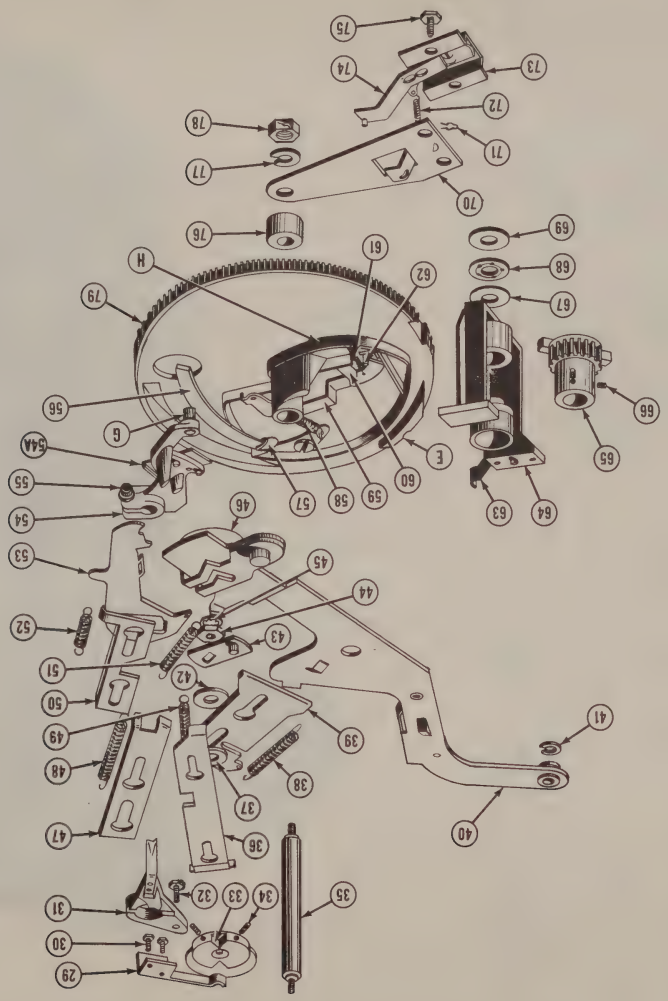
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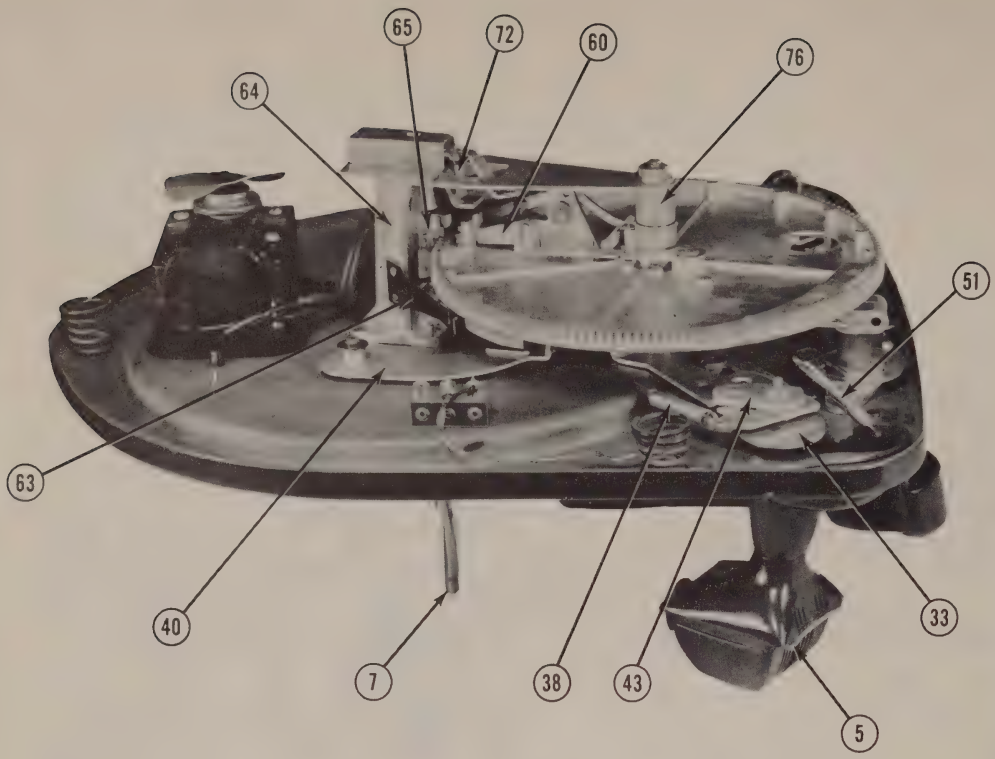

FIG. 5—BOTTOM RIGHT SIDE

As the needle reaches the eccentric groove, the trip shoe (54A) moves in and actuates the trip lever (59), allowing the clutch engagement lever (62) to drop, making contact with the stud of the pinion gear (65). As the drive gear (79) rotates, the shut-off pawl (80) comes in contact with the stud on the control arm (40) sliding the control arm knob (22) into the "Man." position. At this point, the tone arm lift pin (14) has traveled up the incline of the drive gear raising the tone arm from the record. The stud (G) of the tone arm lever (54) comes in contact with the cam surface (H) of the drive gear (79), causing the tone arm to be moved out away from the spindle. As the drive gear nears the end of its cycle, the shut-off pawl (60) strikes the stud on the control arm (40) and pushes the control arm knob (22) into the "off" position. By this time, the tone arm lift pin (14) has ridden down the inclined surface of the drive gear lowering the tone arm to its rest. As the shut-off pawl (60) strikes the stud of the control arm (40), it is returned to its rest position.

ADJUSTMENTS

Tone Arm Height

The maximum height of the tone arm during the change cycle should be such that there would be 5⁄8″ clearance between the tone arm and the bottom of a 10-inch record on the selector post. The height of the tone arm is adjusted by screw (13).

Tone Arm Positioning

1. Set the control knob in the "Off" position (with the power plug out).
2. Loosen the screw (55) of the tone arm lever (54) just enough to allow the tone arm lever to still hold its position.
3. Place a 10″ record on the turntable and one on the spindle shelf.
4. Push the control knob to "Reject" and release it.
5. Rotate the turntable clockwise until the needle is just about to land on the record.
6. The needle should be approximately 1⁄8″ in from the edge of the record. Correction may be made by slipping the tone arm lever (54) slightly.
7. Tighten the screw (55) in the tone arm lever.

TROUBLES

Changer Fails to Trip at the End of a Record

1. Trip lever spring (61) of the trip lever (59) loose or missing.
2. The trip shoe (54A) is incorrectly set. The trip

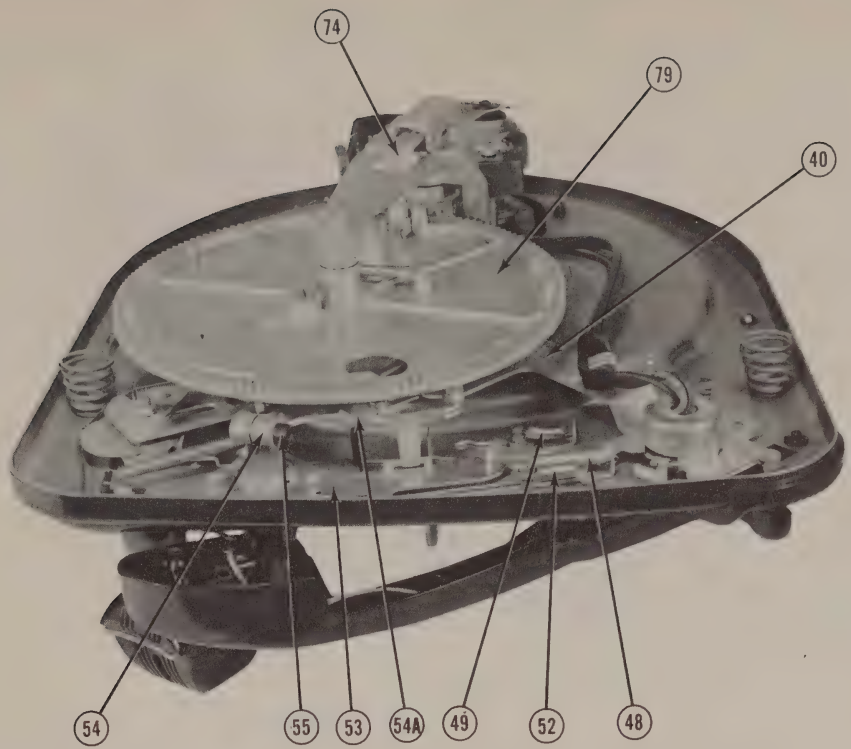

FIG. 6—BOTTOM VIEW REAR

shoe should be adjusted so the changer will trip when the needle is approximately 1⅝" from the record center.

3. The clutch engagement lever (62) not unlatching. Check binding or foreign matter around the lever.

Turntable Speed Slow

1. Lack of lubrication in turntable and pinion gear bearings.
2. Weak idler wheel spring causing idler wheel to slip.
3. Oil or grease on turntable rim.

Changer Trips Continually

1. Clutch engagement lever fails to latch.
   (a) Trip lever (59) binds.
   (b) Spring (61) loose or missing.
   (c) Control arm binds in reject.
2. Stop and detent spring (63) fails to engage the detent in the cam (E) of the drive gear.

Rumble

1. Rubber rim on idler wheel worn or damaged.
2. Changer not properly floated on motor board.
   (a) Be sure shipping bolts have been removed.

Changer Fails to Shut Off After Last Record Has Been Played

1. Check shut-off pawl (60) for binding.
2. Shut-off pawl spring loose or missing.
3. Shut-off lever spring (72) loose or missing.
4. Pawl lever spring loose or missing.
5. Check control arm (40) for binding.

LUBRICATION

Lubrication applied at the time of manufacture is usually sufficient for several years of normal operation. If, after a prolonged period, lubrication becomes necessary, it is recommended to use:

A—*Light Oil*

1. All shafts.
2. Turntable and pinion gear bearings.

B—*Grease, If Necessary*

1. Cam surfaces and gear teeth.

C—*Do Not Lubricate*

1. Clutch engagement lever.
2. Idler wheel rim and turntable rim.

Wipe off all excess lubricant; overlubrication is dangerous.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	S-229058	Record post cap (plastic)
2	S-229054	Record stabilizer
3	S-229057	Rubber bumper
4	S-229055	Record stabilizer spring
5	S-229051	Record ejector blade
6	*S-229045	Ejector drive shaft assembly (includes drive shaft and pin)
7	*S-229087	Offset spindle assembly (includes spindle, slide, and pin)
8	S-229161 S-229162	Pickup arm (solid end) Pickup arm (punched)
9		Hex nut
10	L-230053	Counterbalance spring
11	S-229194	Limit bracket
12	76046	6-32 x ¼ self-tapping screw
13	K-228238	Tone arm adjusting screw
14	S-229113	Pickup arm lift pin
15	S-229041	Record support
16	S-229056	Stabilizer arm spring retainer
17	S-229185	Tone arm hinge bracket assembly
18	*S229120	Turntable assembly (includes turntable and hub, plus S-229083 drive sleeve)
19	70001	Hex nut 8-32
20		Lockwasher
21	S-229140	Escutcheon (plastic)
22	S-229150	Control knob (plastic)
23	S-229193	Snap fasteners
24		Idler wheel (part of item 25)
25	*S-229117	Motor assembly
26	K-228239	Rubber motor grommet
27	76086	Self-tapping screw (8-32 x ⅜)
28		Base plate
29	S-229012	Post detent spring
30	76053	Self-tapping screw (8-32 x ¼)
31	S-229138	Pickup arm locator hub assembly (consists of S-229019 pickup arm locator hub, S-229011 pickup arm detent spring, 79045 rivets)
32	76053	Self-tapping screw (8-32 x ¼)
33	S-229043	10-inch and 12-inch cam
34		Set screw
35	S-229101	Drive gear shaft
36	S-229020	Locator slide
37	72200	Special steel flatwasher
38	S-229053	Ejector drive slide spring
39	S-229052	Ejector drive slide
40	S-229027	Control arm and switch lever cam assembly (consists of S-229028 control arm assembly, S-229033 switch lever cam, S-229034 switch cam stud)
41		"C" washer
42	72200	Special steel flatwasher
43	*S-229048	Ejector drive link assembly (includes drive link and pin)
44		Hex nut
45		Lockwasher
46	K-228213	Switch
47	S-229015	Manual inner slide
48	S-229017	Manual inner slide spring
49	B-27067	Locator slide spring
50	S-229016	Manual outer slide
51	S-229023	Pickup arm locator spring
52	S-229018	Manual outer slide spring
53	S-229022	Pickup arm locator
54		Tone arm lever assembly
55	75081	Set screw
56	K-228176	Retard lever
57	K-228175 B-27088	Retard lever bumper Retard lever screw
58		Retard lever spring
59	S-229108 K-228214 K-228203	Trip lever Trip lever screw Trip lever bumper
60	S-229106	Shut-off pawl
61	B-27092	Trip lever spring
62	S-229105	Clutch engagement lever
63	S-229080	Stop and detent spring
64	S-229079	Spindle housing and bushings
65	S-229086	Pinion gear
66		Set screws
67	S-229131	Spindle ball race washer
68	*S-229132	Ball race assembly
69	S-229131	Spindle ball race washer
70	S-229092	Tie plate
71		Hairpin clip
72	S-229100	Shut-off lever spring
73	*S-229094	Shut-off bracket assembly (includes shut-off lever, shock spring, rivets, support bracket and pin)
74		Shut-off lever (part of item 73)
75	76046	6-32 x ¼ self-tapping screw
76	S-229182	Drive gear spacer
77	73090	Lockwasher
78	70077	¼-20 nut
79	S-229104	Drive gear
80	S-229109	Shut-off pawl lever
81	J-22121	Shut-off lever spring
82	J-22058	Shut-off pawl spring

*To be sold in assemblies only which are located under the main gear (79).

Note: Items 80, 81, and 82 are not shown on the exploded view but will be seen in the photographs and will have their call-out numbers.

RCA VICTOR MODELS MI-12236, A, B, C,
MI-12237, A, MI-12238, A, MI-12239, A

RCA VICTOR MODEL MI-12238

TRADE NAME	RCA Victor, Models MI-12236,-A,-B,-C, MI-12237,-A, MI-12238,-A, MI-12239,-A.
MANUFACTURER	RCA Victor Div.,Radio Corp. of America, Camden, New Jersey
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES(FOUR)	Types 6J7 1st AF Amp., 6J7 2nd AF Amp., 6L6 Power Output, 5Y3GT Rectifier
POWER SUPPLY	105-125 or 210-250 Volts AC RATING: .58 Amp. @ 117 Volts AC

DESCRIPTION AND APPLICATION

(1) MI-12236 (105-125 V) and MI-12236-A (210-250 V) amplifiers are furnished without covers and without input transformers.

(2) MI-12236-B and MI-12236-C are the same as MI-12236 and MI-12236-A except that an output socket is connected to the 4-ohm terminals of the output transformer.

(3) MI-12237 (105-125 V) and MI-12237-A (210-250V) amplifiers are furnished with covers but without input transformers.

(4) MI-12238 (105-125 V) and MI-12238-A (210-250V) amplifiers are furnished without covers, but with input transformers.

(5) MI-12239 (105-125 V) and MI-12239-A (210-250 V) amplifiers are furnished with covers and input transformers.

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DATE 11/49 SET #78 FOLDER 13

PARTS LIST AND DESCRIPTIONS

RCA VICTOR
MODEL MI-12238

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	1st AF Amp.	6J7	6J7	7R	
V2	2nd AF Amp.	6J7	6J7	7R	
V3	Power Output	6L6	6L6	7AC	
V4	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	25	425		G450/30	KR530		PLS-25	Filter Red-Pos.
C2	25	425		G450/30	KR530		PLS-25	Filter Red-Pos.
C3A	10	450		AFH22J4A	UP1145C		EL-202	■ 1st AF Amp. Decoupling
B	10	450						▲ Filter
C	20	25						Output Cathode Bypass
C4	16	150		PRS150/16	BR1615		UT-161	1st AF Cathode Bypass
C5	.1	400		P488-1	GT4P1		TM-1	1st AF Screen Bypass
C6	.05	400		P488-05	GT485		TM-15	Audio Coupling
C7	.25	200		P488-25	GT2P25		TC-2	Tone Comp.
C8	.1	200		P288-1	GT2P1		TM-1	Tone Comp.
C9	.1	400		P488-1	GT4P1		TM-1	2nd AF Screen Bypass
C10	.05	400		P488-05	GT485		TM-15	Audio Coupling
C11	820	500			1W5T8			AF Feedback

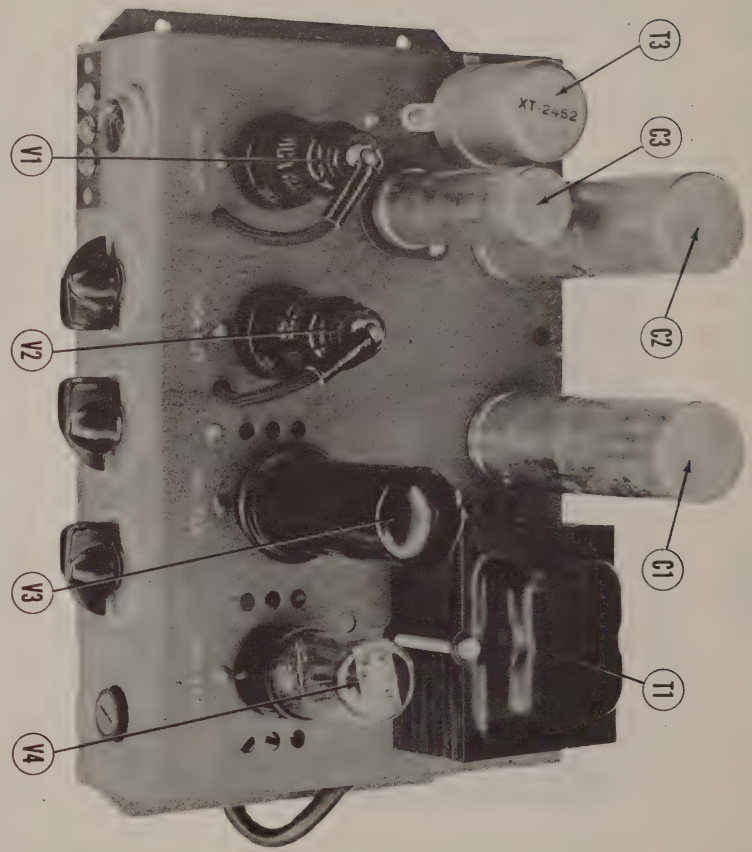
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1	500KΩ	½		Q13-133	M-60-Z	Volume control
R2	500KΩ	½		Q13-133	M-60-Z	Master volume control
R3A	5000Ω	½			M-20-U	Tone control
B	Switch				SW-A	Attach to R2A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	IDENTIFICATION CODES
R4	2200Ω	½		BTS-2200	1st AF Grid
R5	1500Ω	½		BTS-1500	1st AF Cathode
R6	1.2 Meg.	½		BTS-1.2 Meg.	1st AF Screen
R7	270KΩ	½		BTS-270K	1st AF Plate
R8	82KΩ	½		BTS-82K	1st AF Decoupling
R9	470KΩ	½		BTS-470K	Tone Compensation
R10	47Ω	½		BW-½-47	Tone Compensation
R11	470KΩ	½		BTS-470K	Tone Compensation
R12	1000Ω	½		BTS-1000	2nd AF Cathode
R13	1.2 Meg.	½		BTS-1.2 Meg.	2nd AF Screen
R14	220KΩ	½		BTS-220K	2nd AF Plate
R15	82KΩ	½		BTS-82K	Feedback
R16	330KΩ	½		BTS-330K	Output Grid
R17	220Ω	2		BW-2-220	Output Cathode
R18	8200Ω	2		BT-2-8200	Filter
R19	33KΩ	2		BT-2-33K	Bleeder
R20	33KΩ	2		BT-2-33K	Bleeder
R21	440Ω	10		AB-450	Filter Wire Wound
R22	33Ω	½		BW-½-33	Voltage Divider
R23	33Ω	½		BW-½-33	Voltage Divider

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1A	117VAC @ .58A	700VCT .070ADC	5VAC @ 2A	6.3VAC @ 1.5A	‡	P-6011 †	P-2952 †	PH-70B †
B	117/220 VAC							

† Drill new mounting holes.
‡ Used in models MI-12236 A and C, and MI-12238 A

TRANSFORMER (INPUT)

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO PRI. TO SEC.	DC RES. PRI.	DC RES. SEC.	RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
T2	1 TO 10	44Ω CT	78Ω	§				§ Used in MI-12238,A and MI-12239,A

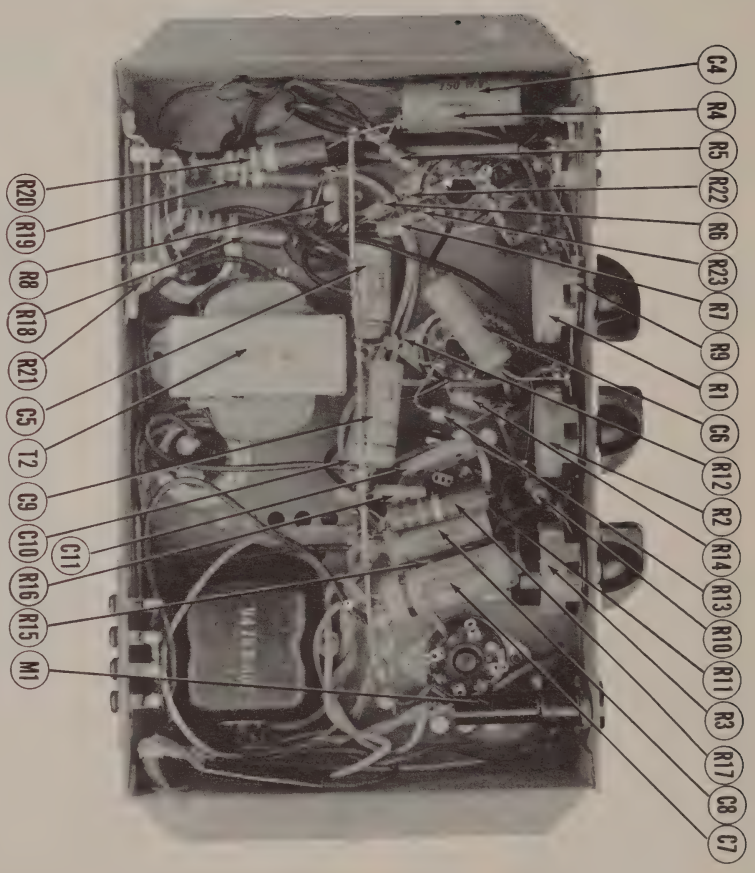
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE PRI.	IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.	RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
T3	4KΩ	15Ω 7.5Ω 4Ω	340Ω	1.4Ω 1.0Ω .75Ω		A-3825		RO-305 #	# Drill one new mounting hole.

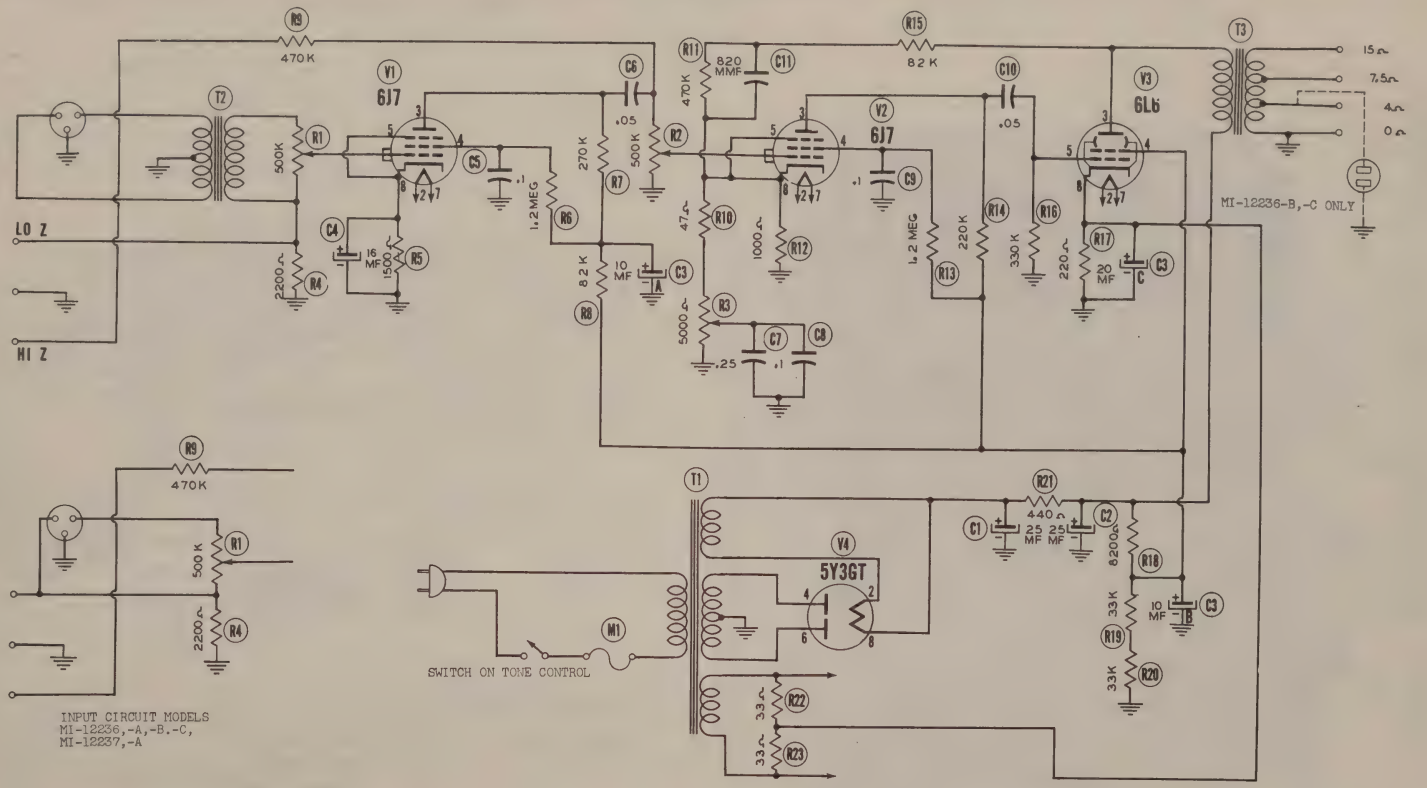
MISCELLANEOUS

ITEM No.	PART NAME	RCA PART No.	NOTES
M1	Fuse		1 Amp.

CHASSIS—BOTTOM VIEW



RCA VICTOR MODEL MI-12238



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	TOP CAP
V 1	6J7	0V	#	57VDC	27VDC	1.1VDC	0V	#	1.1VDC	0V
V 2	6J7	0V	#	115VDC	40VDC	1.1VDC	0V	#	1.1VDC	0V
V 3	6L6	0V	#	300VDC	240VDC	0V	0V	#	15VDC	
V 4	5Y3GT	0V	350VDC	0V	345VAC	0V	345VAC	0V	350VDC	

6.3VAC measured across filament.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	TOP CAP
V 1	6J7	0Ω	260Ω	†350KΩ	†1.3Meg	1.5KΩ	Inf.	260Ω	1.5KΩ	2.2KΩ
V 2	6J7	0Ω	260Ω	†220KΩ	†1.2Meg	900Ω	Inf.	260Ω	900Ω	17Ω
V 3	6L6	0Ω	260Ω	†800Ω	†9KΩ	330KΩ	Inf.	260Ω	220Ω	
V 4	5Y3GT	Inf.	50KΩ	Inf.	250Ω	Inf.	235Ω	Inf.	50KΩ	

† Measured from pin 8 of V4

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

PHOTOFACT* Folder

WESTINGHOUSE H-223

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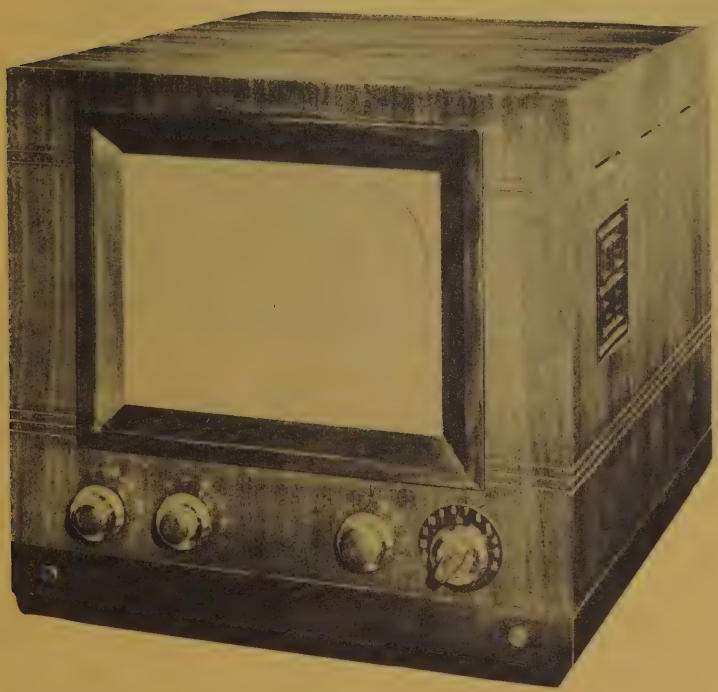
Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



WESTINGHOUSE H-223

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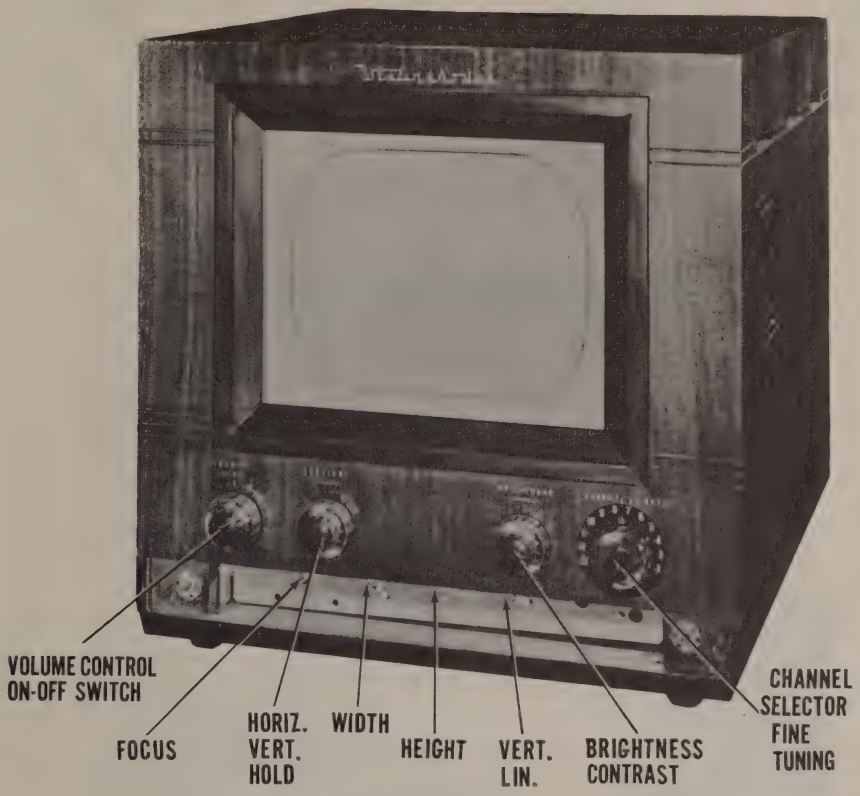

WESTINGHOUSE MODEL
H-223 (Ch. V-2150-01, V-2150-02)

TRADE NAME	Westinghouse Model H-223 (Chassis V-2150-01, V-2150-02)
MANUFACTURER	Westinghouse Electric Corp., Receiver Div., Sunbury, Pa.
TYPE SET	TV Receiver
TUBES	Twenty Five
POWER SUPPLY	105-120 Volts AC-60 Cycle RATING: 1.5 Amp. @ 117 Volts AC
TUNING RANGE-	Channels 2 thru 13

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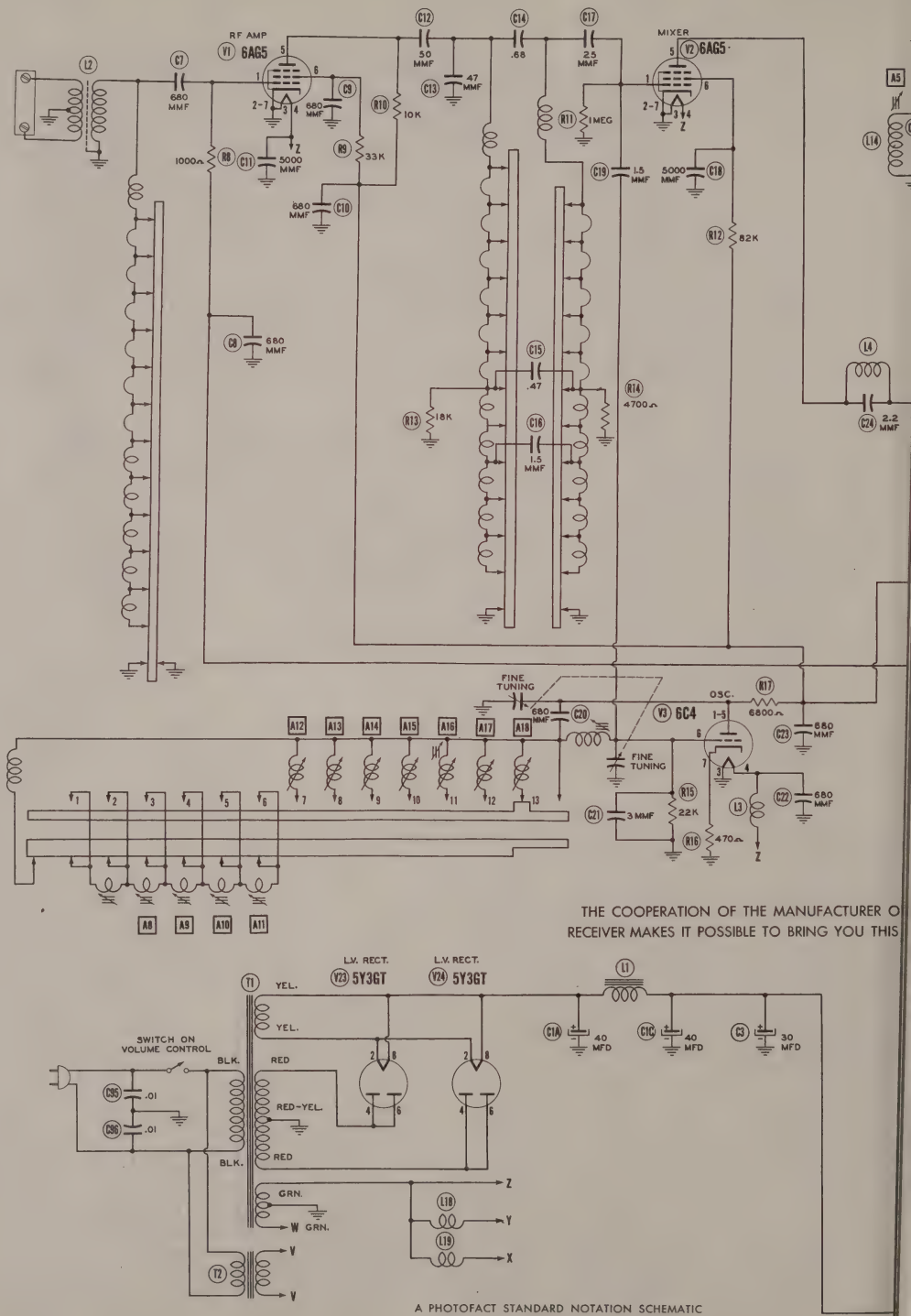

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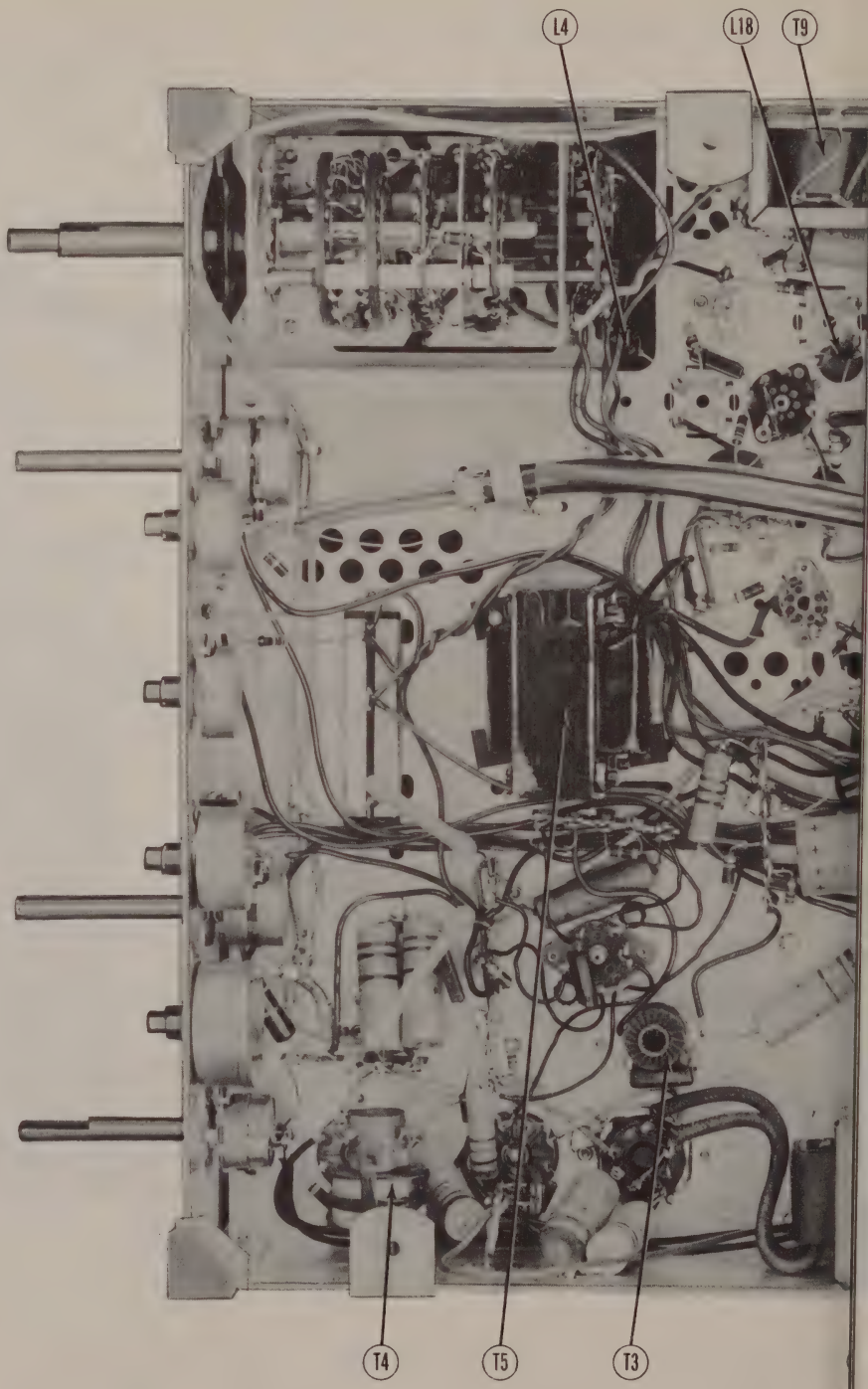
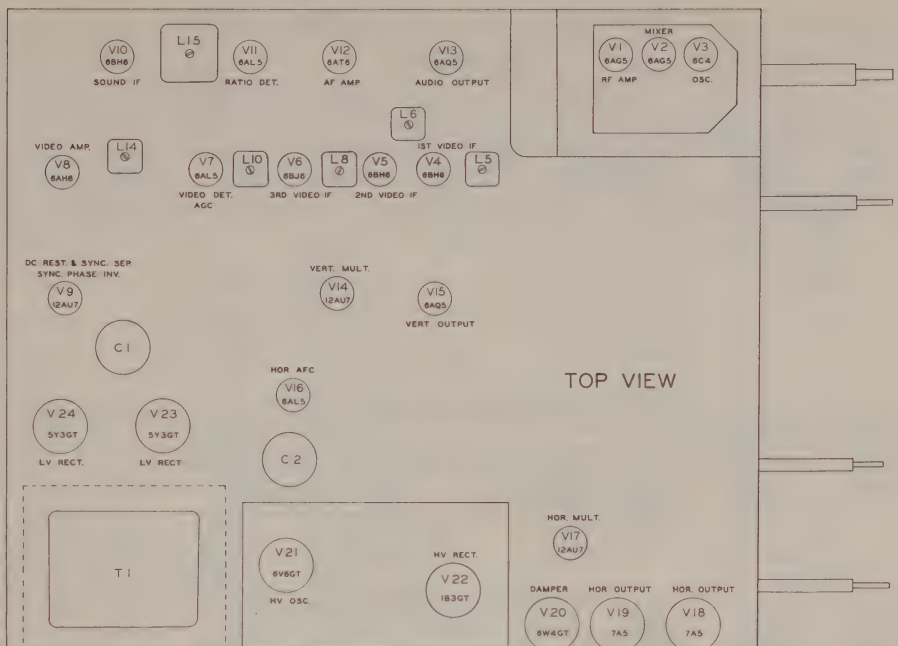
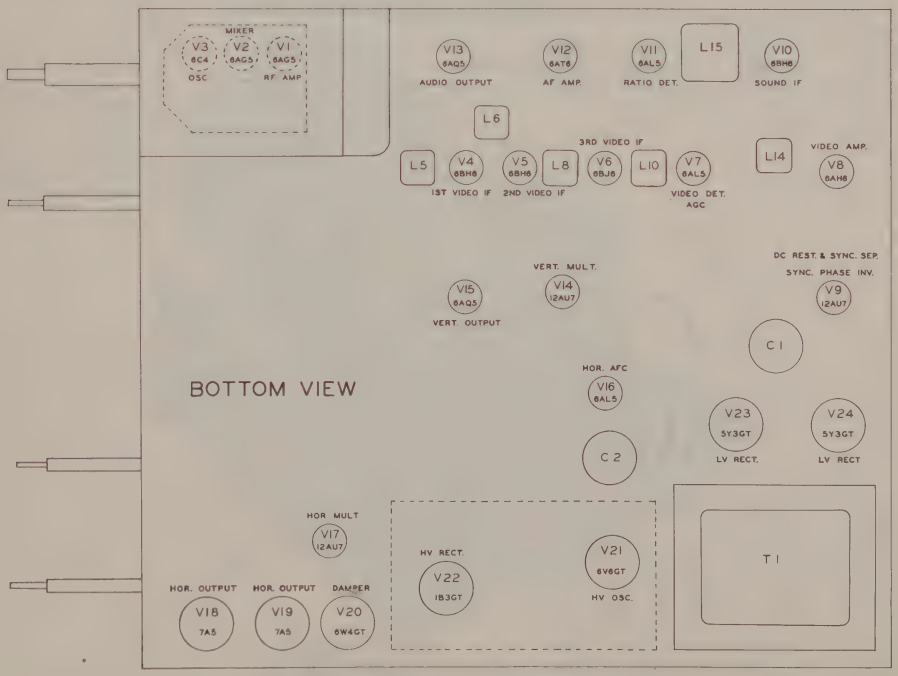
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., IND





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If the receiver is to be aligned with the picture tube removed, remove the 6V6GT high voltage oscillator tube V21, to eliminate the shock hazard from the high voltage power supply.

VIDEO IF ALIGNMENT

Connect a bonding strap from the signal generator to the receiver chassis. After beginning alignment, place your hand at different points on the chassis; if there is any noticable change in the VTVM reading, connect additional bonding straps to various points on the chassis until touching the chassis causes no change in the VTVM reading.

Use the lowest scale on the VTVM and keep the output of the signal generator attenuated so that the VTVM reading does not exceed -2 volts.

Remove the local oscillator tube V3 to prevent erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	23.6MC (Unmod.)	Any	DC Probe to Video test jack. Common to chassis.	A1	Adjust for maximum deflection.
2.		"	24.1MC (Unmod.)	"	"	A2	"
3.		"	26.1MC (Unmod.)	"	"	A3	"
4.		"	25.5MC (Unmod.)	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

Construct a filter for the oscilloscope vertical amp. input consisting of a 200KΩ resistor in series with the vertical amp. input lead, and a 500MMF capacitor connected across the vertical amp. input terminals.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	25.3MC (10MC Sweep)	23.5MC 23.8MC 25.5MC 26.1MC	Any	Vert. Amp. thru 200KΩ to video test jack. Low side to chassis.		Check for response curve as per Fig 1. with markers as shown. The 26.1MC and 23.5MC markers should be between 40 and 50 percent of maximum response. If necessary retouch A1 thru A4 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to video test jack. Low side to chassis.	4.5MC (Unmod.)	Any	DC Probe to Point (A) Low side to chassis.	A5,A6	Adjust for maximum deflection.
7.	.001MFD	"	"	"	DC Probe to Point (B) Common to Point (A)	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated singal with 60\ modulation and 450KC sweep. Use 120\ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.001MFD	High side to video test jack. Low side to chassis.	4.5MC (450KC Sweep)	4.5MC	Any	Vert. Amp. to Point (A) Low side to chassis.	A5,A6	Disconnect stabilizer capacitor C5. Adjust for maximum amplitude and symmetry as per Fig 2.
7.	.001MFD	"	"	"	"	Vert. Amp. to Point (B) Low side to chassis.	A6,A7	Reconnect capacitor C5. Adjust A8 so 4.5MC occurs at center of crossover lines as per Fig 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

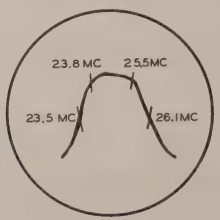


FIG. 1

FIG. 2

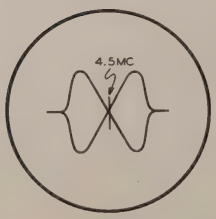


FIG. 3

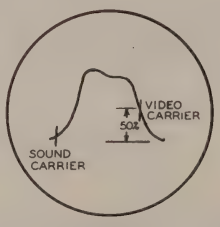


FIG. 4

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

The RF and mixer lines are adjusted at the factory and are very stable and normally will not require adjustment in the field.

Some of this model receivers have oscillator adjustment screws for all 13 channels, and they are accessible thru holes in the front of the tuner.

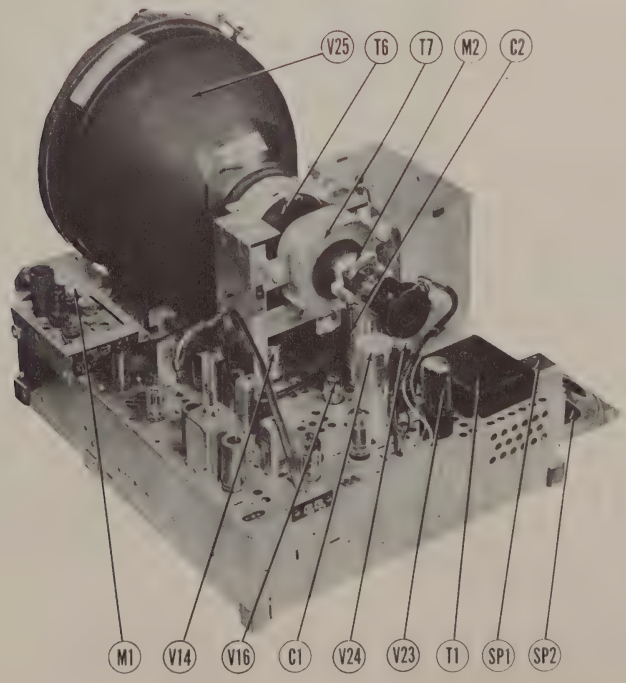
Some sets have oscillator adjustment screws for the low band channels only. On these sets, the adjustments are accessible only from the underside of the chassis.

The high band channels have coils which are adjusted by expanding or compressing the turns.

Set the fine tuning control to the mid-position of its range.

Replace the local oscillator tube V3 if it had previously be removed for the video IF alignment.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	300Ω carbon res.	Across antenna terminals with 300Ω in series with high side.	57MC (10MC Sweep)	55.25MC 59.75MC	2	Vert. Amp. to video test jack. Low side to chassis.	A8	Adjust to place video marker at 50% response as per Fig 4.
9.	"	"	63MC (10MC Sweep)	61.25MC 65.75MC	3	"	A9	"
			69MC (10MC Sweep)	67.25MC 71.75MC	4		A10	
			79MC (10MC Sweep)	77.25MC 81.75MC	5		A11	
			85MC (10MC Sweep)	83.25MC 87.75MC	6		A12	
10.	"	"	177MC (10MC Sweep)	175.25MC 179.75MC	7	"	A13	Expand or compress coil turns to place video marker at 50% response as per Fig 4.
11.	"	"	183MC (10MC Sweep)	181.25MC 185.75MC	8	"	A14	"
			189MC (10MC Sweep)	187.25MC 191.75MC	9		A15	
			195MC (10MC Sweep)	193.25MC 197.75MC	10		A16	
			201MC (10MC Sweep)	199.25MC 203.75MC	11		A17	
			207MC (10MC Sweep)	205.25MC 209.75MC	12		A18	
			213MC (10MC Sweep)	211.25MC 215.75MC	13		A19	



CHASSIS-TOP VIEW

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-.6VDC	0V	0V	6.3VAC	115VDC	115VDC	0V		
V 2	6AG5	-1.2VDC	0V	0V	6.3VAC	210VDC	97VDC	0V		
V 3	6C4	150VDC	0V	0V	6.3VAC	150VDC	§-1VDC	4.5VDC		
V 4	6BH6	-.5VDC	.5VDC	6.3VAC	0V	220VDC	120VDC	0V		
V 5	6BH6	-.5VDC	.4VDC	6.3VAC	0V	220VDC	120VDC	0V		
V 6	6BJ6	0V	.7VDC	6.3VAC	0V	220VDC	75VDC	0V		
V 7	6AL5	.5VDC	-.1VDC	6.3VAC	0V	1.3VDC	0V	0V		
V 8	6AH6	0V	0V	6.3VAC	0V	125VDC	150VDC	1.8VDC		
V 9	12AU7	8.5VDC	0V	1.3VDC	6.3VAC	6.3VAC	115VDC	0V	6.2VDC	0V
V 10	6BH6	0V	.8VDC	6.3VAC	0V	215VDC	120VDC	-.1VDC		
V 11	6AL5	-.2VDC	-.2VDC	6.3VAC	0V	0V	0V	-.4VDC		
V 12	6AT6	-.5VDC	0V	6.3VAC	0V	-.5VDC	0V	65VDC		
V 13	6AQ5	0V	8.7VDC	6.3VAC	0V	160VDC	170VDC	0V		
V 14	12AU7	117VDC	0V	5.2VDC	6.3VAC	6.3VAC	32VDC 60VDC	-3.8VDC	5.2VDC	0V
V 15	6AQ5	0V	15VDC 22VDC	6.3VAC	0V	212VDC	212VDC	0V		
V 16	6AL5	2.4VDC	-1.9VDC	0V	6.3VAC	0V	0V	0V		
V 17	12AU7	185VDC	.1VDC	8.8VDC	6.3VAC	6.3VAC	80VDC	0V	8.8VDC	0V
V 18	7A5	0V	155VDC 240VDC	130VDC	132VDC	-15VDC	-15VDC	5.1VDC	6.3VAC	
V 19	7A5	0V	155VDC 240VDC	130VDC	132VDC	-15VDC	-15VDC	5.1VDC	6.3VAC	
V 20	6W4GT	0V	6.3VAC	155VDC 240VDC	0V	65VDC	0V	155VDC 240VDC	155VDC 240VDC	
V 21	6V6GT	0V	0V	225VDC	125VDC	-16VDC	-15VDC	6.3VAC	0V	
V 22	1B3GT	* DO NOT MEASURE								
V 23	5Y3GT	0V	270VDC	0V	300VAC	0V	300VAC	0V	270VDC	
V 24	5Y3GT	0V	270VDC	0V	300VAC	0V	300VAC	0V	270VDC	
V 25	10BP4	0V	1.4VDC	PIN 10 230VDC	PIN 11 150VDC	PIN 12 6.3VAC				

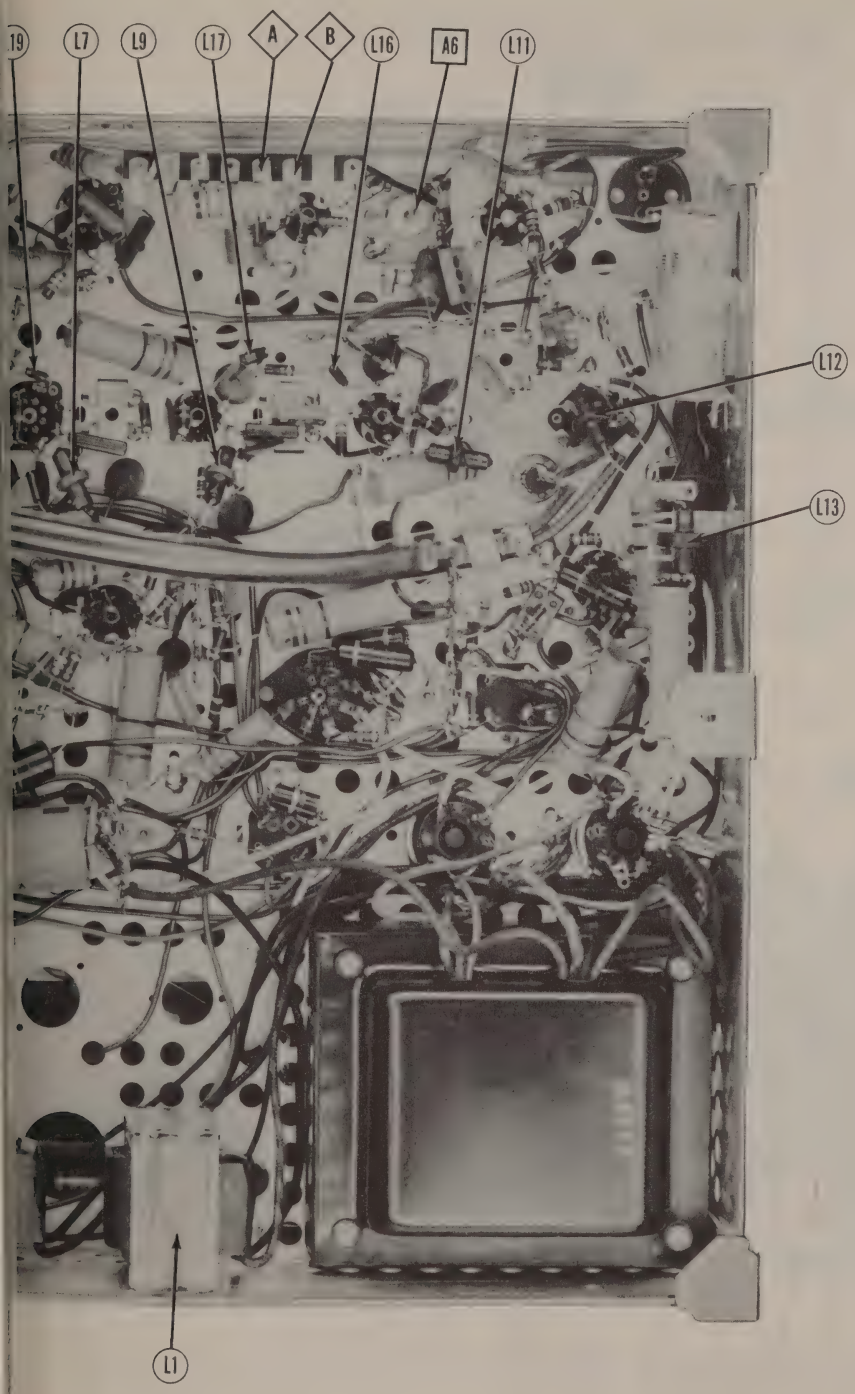
§ Taken with vacuum tube voltmeter.

RESISTANCE READINGS

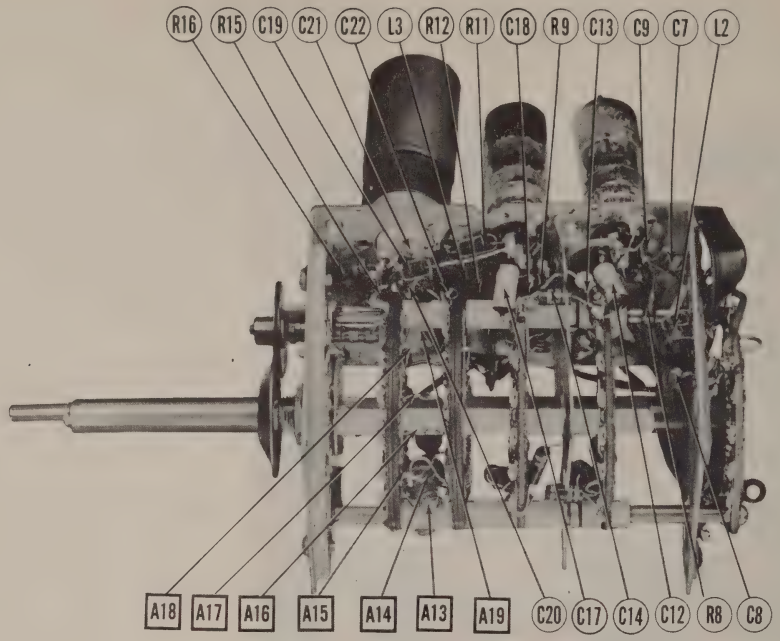
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	3.2 Meg.	0Ω	0Ω	.1Ω	†11KΩ	†34KΩ	0Ω		
V 2	6AG5	1 Meg.	0Ω	0Ω	.1Ω	†1.2KΩ	†82KΩ	0Ω		
V 3	6C4	†7KΩ	Inf.	0Ω	.1Ω	†7KΩ	22KΩ	470Ω		
V 4	6BH6	3.2 Meg.	100Ω	.1Ω	0Ω	†1.2KΩ	†8KΩ	0Ω		
V 5	6BH6	3.2 Meg.	100Ω	.1Ω	0Ω	†200Ω	†8KΩ	0Ω		
V 6	6BJ6	0Ω	68Ω	.1Ω	0Ω	†200Ω	†47KΩ	0Ω		
V 7	6AL5	5KΩ	1 Meg.	.1Ω	0Ω	1000Ω	0Ω	0Ω		
V 8	6AH6	10Ω	0Ω	.1Ω	0Ω	†10KΩ	†27KΩ	150Ω		
V 9	12AU7	47KΩ	0Ω	470KΩ	.1Ω	.1Ω	†10KΩ	1 Meg.	4KΩ	0Ω
V 10	6BH6	470KΩ	120Ω	.1Ω	0Ω	†1.2KΩ	†7KΩ	3.2 Meg.		
V 11	6AL5	Inf.	Inf.	.1Ω	0Ω	0Ω	0Ω	20KΩ		
V 12	6AT6	10 Meg.	0Ω	.1Ω	0Ω	3.2 Meg.	0Ω	†300KΩ		
V 13	6AQ5	470KΩ	330Ω	.1Ω	0Ω	†1.2KΩ	†1000Ω	470KΩ		
V 14	12AU7	†47KΩ	120KΩ	2.2KΩ	.1Ω	.1Ω	†1.5Meg. †470KΩ	330KΩ	2.2KΩ	0Ω
V 15	6AQ5	2.2 Meg.	6KΩ 1000Ω	.1Ω	0Ω	†900Ω	†900Ω	2.2 Meg.		
V 16	6AL5	4.8 Meg.	4.8 Meg.	0Ω	.1Ω	68KΩ	0Ω	68KΩ		
V 17	12AU7	†16KΩ	5 Meg.	1.8KΩ	.1Ω	.1Ω	†230KΩ	100KΩ	1.8KΩ	0Ω
V 18	7A5	0Ω	†6KΩ †550Ω	†8KΩ	†8KΩ	470KΩ	470KΩ	50Ω	.1Ω	
V 19	7A5	0Ω	†6KΩ †550Ω	†8KΩ	†8KΩ	470KΩ	470KΩ	50Ω	.1Ω	
V 20	6W4GT	Inf.	60Ω	†6KΩ †550Ω	Inf.	†4KΩ	Inf.	†6KΩ †550Ω	†6KΩ †550Ω	
V 21	6V6GT	0Ω	0Ω	†300Ω	†10KΩ	2.2KΩ	2.2KΩ	.1Ω	0Ω	
V 22	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP †900Ω
V 23	5Y3GT	Inf.	40KΩ	Inf.	34Ω	Inf.	34Ω	Inf.	40KΩ	
V 24	5Y3GT	Inf.	40KΩ	Inf.	32Ω	Inf.	32Ω	Inf.	40KΩ	
V 25	10BP4	0Ω	470KΩ	PIN 10 †200Ω	PIN 11 10KΩ	PIN 12 .1Ω				

† Measured from pin 8 of V23.

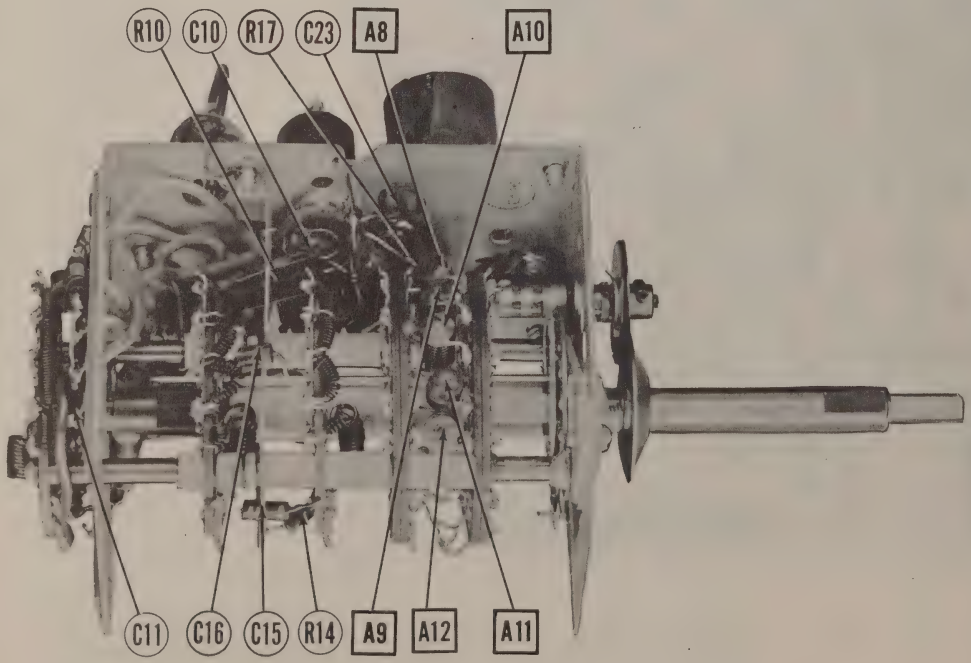
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



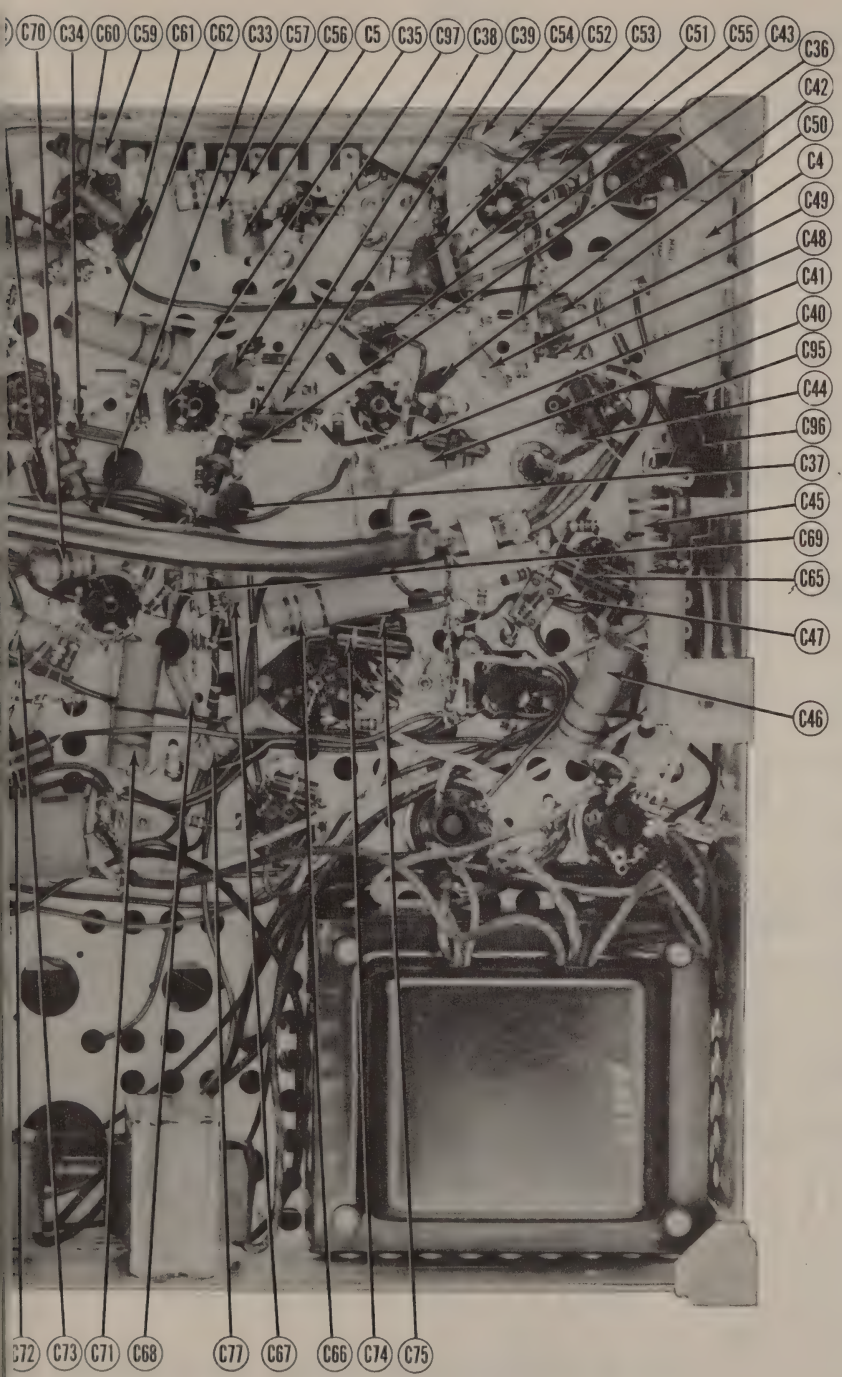
TOR AND ALIGNMENT IDENTIFICATION



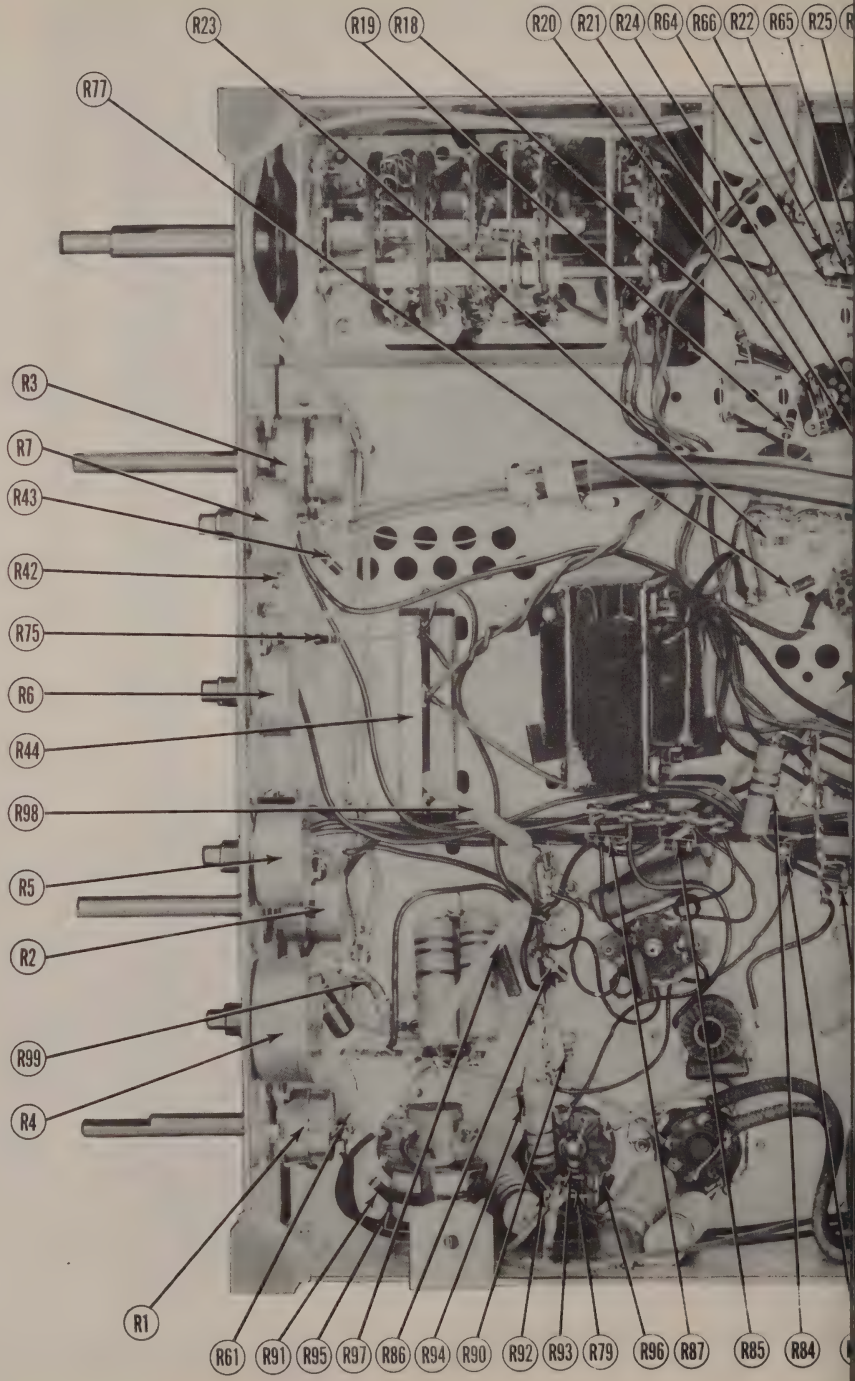
RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



ACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW

BLOCK DIAGRAM

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	6C4	6C4	6BG	
V4	1st Video IF	6BH6	6BH6	7CM	
V5	2nd Video IF	6BH6	6BH6	7CM	
V6	3rd Video IF	6BJ6	6BJ6	7CM	
V7	Video Det.-AGC Rectifier	6AL5	6AL5	6BT	
V8	Video Amp.	6AH6	6AH6	7BK	
V9	DC Restorer - Sync. Sep. & Sync. Phase Inv.	12AU7	12AU7	9A	
V10	Sound IF Amp.	6BH6	6BH6	7CM	
V11	Ratio Det.	6AL5	6AL5	6BT	
V12	AF Amp.	6AT6	6AT6	7BT	
V13	Audio Output	6AQ5	6AQ5	7BZ	
V14	Vertical Multivibrator	12AU7	12AU7	9A	
V15	Vert. Output	6AQ5	6AQ5	7BZ	
V16	Hor. AFC	6AL5	6AL5	6BT	
V17	Horizontal Multivibrator	12AU7	12AU7	9A	
V18	Hor. Output	7A5	7A5	6AA	
V19	Hor. Output	7A5	7A5	6AA	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Osc.	6V6GT	6V6GT	7AC	
V22	HV Rectifier	1B3GT	1B3GT	3C	
V23	LV Rectifier	5Y3GT	5Y3GT	5T	
V24	LV Rectifier	5Y3GT	5Y3GT	5T	
V25	Picture Tube	10BP4	10BP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WESTINGHOUSE Part No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	350	V-6509	AFH888H30B	UP11CJ 1098		D14913	◓ Filter
B	40	350			BRH5015			■ Filter
C	40	350						▲ Filter
D	150	50						Vert. Output Cath. Byp.
C2A	80	350	V-5891	AF16222H	UP11DJ		TVL-30	◓ Filter *
B	10	350			1047		TVA-25	■ Filter *
C	10	350						▲ Vert. MV Plate Dec.
D	10	350						V. Amp. Screen Bypass
C3	30	450	V-6570	PRS450/30	BR3045A		TVA-23	Filter
C4	1000	6	V-6776	PRS6/1000	BRH610		TVA-1	V. Amp. Cath. Bypass
C5	2	50	V-4880	PRS150/4	BBR2-50		TVA-12	Stabilzing Cap.
C6	20	25	V-3236	PRS25/25	BR202A		TVA-6	Output Cath. Bypass
C7	680					GP2K-680		RF Coupling
C8	680					GP2K-680		AGC Filter
C9	680					GP2K-680		RF Screen Bypass
C10	680					GP2K-680		RF Bypass
C11	5000					811-005		RF Fil. Bypass
C12	50					GP1K-50		RF Coupling
C13	47							Fixed Trimmer
C14	.68							RF Coupling
C15	.47							RF Coupling
C16	1.5					NP0K-1.5		RF Coupling
C17	25					GP1K-25		RF Coupling
C18	5000					811-005		Mixer Screen Bypass
C19	1.5					NP0K-1.5		Osc. Coupling
C20	680					GP2K-680		Osc. Feedback
C21	3					NP0K-3		Osc. Feedback
C22	680					GP2K-680		Osc. Fil. Bypass
C23	680					GP2K-680		RF Bypass
C24	2.2		V-6558-2					Fixed Trimmer †
C25	270	500	RCM20B271K	1468-00025	5W5T25	GP2K-270	1FM-325	IF Coupling
C26	5000		V-5596	1467-005	1D5D5	811-005	29C1	Mixer Plate Decoupling
C27	5000		V-5596	1467-005	1D5D5	811-005	29C1	AGC Filter
C28	5000		V-5596	1467-005	1D5D5	811-005	29C1	1st V. IF Screen Bypass
C29	5000		V-5596	1467-005	1D5D5	811-005	29C1	1st V. IF Plate Dec.
C30	270	500	RCM20B271K	1468-00025	5W5T25	GP2K-270	1FM-325	IF Coupling
C31	5000		V-5596	1467-005	1D5D5	811-005	29C1	AGC Filter
C32	5000		V-5596	1467-005	1D5D5	811-005	29C1	2nd V. IF Screen Bypass
C33	5000		V-5596	1467-005	1D5D5	811-005	29C1	RF Bypass
C34	270	500	RCM20B271K	1468-00025	5W5T25	GP2K-270	1FM-325	IF Coupling
C35	5000		V-5596	1467-005	1D5D5	811-005	29C1	3rd V. IF Cath. Bypass
C36	5000		V-5596	1467-005	1D5D5	811-005	29C1	3rd V. IF Screen Bypass
C37	5000		V-5596	1467-005	1D5D5	811-005	29C1	RF Bypass
C38	100	500	RCM20B101K	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C39	100	500	RCM20B101K	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C40	.1	400	V-6023-4104M	P488-1	GT4P1		TM-1	AGC Filter
C41	4.7		V-5658-6	1468-000005	5W5V5	NP0K-5	MS-55	V. Diode Filter
C42	5000		V-5596	1467-005	1D5D5	811-005	29C1	RF Bypass
C43	5000		V-5596	1467-005	1D5D5	811-005	29C1	V. DET-AGC Fil. Bypass
C44	100	500	RCM20B101K	1468-0001	5W5T1	GP1K-100	1FM-31	Video Coupling
C45	.1	400	V-6023-4104M	P488-1	GT4P1		TM-1	Video Coupling
C46	.1	400	V-6023-4104M	P488-1	GT4P1		TM-1	Pic. Tube Cath. Dec.
C47	22	500	RCM20B220K	1468-000025	5W5Q25	GP1K-22	MS-425	DC Res. Plate Bypass
C48	2		V-5658-2					S. IF Coupling
C49	5	500		1469-000005	5R5V5	NP0K-5	MS-55	Fixed Trimmer
C50	47	500	RCM20B470K	1468-00005	5W5Q5	GP1K-47	1FM-45	AVC Filter
C51	470	500	RCM20B471K	1468-0005	5W5T5	GP2K-470	1FM-35	AVC Filter
C52	.01	400	V-6023-4103M	P488-01	GT4S1	GP2-335-01	TM-11	RF Bypass
C53	10	500	RCM20B100K	1468-00001	5W5Q1	GP1K-10	MS-41	S. IF Coupling
C54	.01	400	V-6023-4103M	P488-01	GT4S1	GP2-335-01	TM-11	S. IF Plate Dec.
C55	680	500	RCM20B681M	1468-0005	1W5T7	GP2K-680	1FM-37	Diode Load Cap.
C56	.0022	600	V-6023-6202M	P688-0022	GT6D2	GP2M-0022	TM-22	De-emphasis
C57	.01	400	V-6023-4103M	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C58	.01	400	V-6023-4103M	P488-01	GT4S1	GP2-335-01	TM-11	Tone Compensation

CAPACIT

ITEM No.	RATING: -CAP.	RATING: VOLT	REPLACEMEN: WESTINGHOUSE PART No.	REPLACEMEN: AEROVOX PART No.	COR DUB PAR
C59	.01	400	V-6023-4103M	P488-01	GT4S
C60	100	500	RCM20B101K	1468-0001	SW5T
C61	270	500	RCM20B271K	1468-00025	SW5T
C62	.1	400	V-6023-4104M	P488-1	GT4S
C63	.01	400	V-6023-4103M	P488-01	GT4S
C64	.0022	600	V-6023-6202M	P688-0022	GT6D
C65	.01	400	V-6023-4103M	P488-01	GT4S
C66	.1	400	V-6023-4104M	P488-1	GT4P
C67	470	500	RCM20B471K	1468-0005	SW5T
C68	470	500	RCM20B471K	1468-0005	SW5T
C69	470	500	RCM20B471K	1468-0005	SW5T
C70	.022	400	V-6023-4223K	P488-022	GT4S
C71	.1	400	V-6023-4104M	P488-1	GT4P
C72	.1	400	V-6023-4104M	P488-1	GT4P
C73	.1	400	V-6023-4104M	P488-1	GT4P
C74	.001	600	V-6023-6102M	P688-001	GT6D
C75	.001	600	V-6023-6102M	P688-001	GT6D
C76	330	500	RCM20C331J	1468-00035	SW5T
C77	.0033	600	V-6023-6332M	P688-0033	GT6D
C78	.0047	400	V-6023-4472M	P688-0047	GT6D
C79	.047	400	V-6023-4503M	P488-047	GT4S
C80	330	500	RCM20C331J		
C81	3900	500	RCM30C392K		
C82	.1	400	V-6023-4104M	P488-1	GT4P
C83	330	500	RCM20C331J		
C84	.01	400	V-6023-4103M	P488-01	GT4S
C85	.1	400	V-6023-4104M	P488-1	GT4P
C86	.1	400	V-6023-4104M	P488-1	GT4P
C87	.1	400	V-6023-4104M	P488-1	GT4P
C88	.1	400	V-6023-4104M	P488-1	GT4P
C89	.25	400	V-6023-4254M	P488-25	GT4S
C90	.047	400	V-6023-4503M	P488-047	GT4S
C91	.047	400	V-6023-4503M	P488-047	GT4S
C92	.047	400	V-6023-4503M	P488-047	GT4S
C93	500	10000	V-5895		
C94	500	10000	V-5895		
C95	.01	600	V-5040-15	P688-01	GT6S
C96	.01	600	V-5040-15	P688-01	GT6S
C97	5000		V-5596	1467-005	1D5I

* In later production the positions of C
† Not used in all models.

CO

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTING-HOUSE PART No.	REPLACEMENT DATA: IRC PART No.	CL PA
R1A	1 Meg.	½	V-6465	Q13-137X	
B	Switch		Not Req.	76-1	
R2A	250KΩ	½	V-6464	B11-130§	
B	250KΩ	½		B11-130§	
C	Shaft End			E-202 §	
R3A	5000Ω	½	V-6466	B11-114§	
B	50KΩ	½		B11-123 §	
C	Shaft End			E-202 §	
R4	275Ω	4	V-6551		10-
R5	5000Ω	2	V-6500-1	W-5000	58-
R6	1 Meg.	½	V-6462	Q11-137	M-6
R7	5000Ω	½	V-6463	Q11-114	M-1

§ Additional parts to be used with "Conce

RE

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTING-HOUSE PART No.	REPLACEMENT DATA: IRC PART No.
R8	1000Ω	½		BTS-1000
R9	33KΩ	½		
R10	10KΩ	1		
R11	1 Meg.	½		
R12	82KΩ	½		
R13	18KΩ	½		
R14	4700Ω	½		BTS-4700
R15	22KΩ	½		
R16	470Ω	½		BTS-470
R17	6800Ω	1		
R18	1000Ω 20%	½	RC20AE102M	BTS-1000
R19	47KΩ	½	RC20AE473K	
R20	100Ω	½	RC20AE101K	
R21	1000Ω 20%	½	RC20AE102M	BTS-1000
R22	1000Ω 20%	½	RC20AE102M	BTS-1000
R23	10KΩ	½	RC20AE103K	BTS-10K
R24	10KΩ 20%	½	RC20AE103M	BTS-10K
R25	10KΩ	½	RC20AE103K	BTS-10K
R26	100Ω	½	RC20AE101K	
R27	1000Ω 20%	½	RC20AE102M	BTS-1000
R28	22KΩ	½	RC20AE223K	
R29	68Ω	½	RC20AE680K	
R30	47KΩ	½	RC20AE473K	
R31	2.2 Meg.	½	RC20AE225K	BTS-2.2 M
R32	1 Meg.	½	RC20AE105K	BTS-1 Meg
R33	1000Ω	½	RC20AE102K	BTS-1000
R34	100KΩ	½	RC20AE104K	BTS-100K
R35	150Ω	½	RC20AE151K	
R36	27KΩ	½	RC20AE273K	BTS-27K
R37	22KΩ	½	RC20AE223K	BTS-22K
R38	10KΩ	10	VS924-2	AH-10K
R39	12KΩ	1	RC30AE123K	BTA-12K
R40	12KΩ	1	RC30AE123K	BTA-12K
R41	2200Ω	½	RC20AE222K	BTS-2200

DESCRIPTIONS

(CONT.)

ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
P2-335-01	TM-11	Audio Coupling
P1K-100	1FM-31	AF Grid Bypass
P2K-270	1FM-325	AF Plate Bypass
	TM-1	AF Plate Decoupling
P2-335-01	TM-11	Audio Coupling
P2M-0022	TM-22	Output Plate Bypass
P2-335-01	TM-11	Sync. Coupling
	TM-1	Vert. Sync. Coupling
P2K-470	1FM-35	Integrator Net.
P2K-470	1FM-35	Integrator Net.
P2K-470	1FM-35	Integrator Net.
	TM-12	Vert. MV Feedback
	TM-1	Vert. MV Cath. Bypass
	TM-1	Vert. Discharge
	TM-1	Vert. Sweep Coupling
P2L-001	TM-21	Hor. Sync. Coupling
P2L-001	TM-21	Hor. Sync. Coupling
P2K-330	1FM-335	AFC Feedback
P2M-0033	TM-23	AFC Filter
P2M-0047	TM-25	AFC Filter
	TM-15	AFC Filter
P2K-330		Hor. MV Feedback Fixed Trimmer
	TM-1	Hor. MV Plate Dec.
P2K-330		Hor. Discharge
P2-335-01	TM-11	Hor. Sweep Coupling
	TM-1	Hor. Output Screen Byp.
	TM-1	Hor. Output Cath. Byp.
	TM-1	Hor. Sweep Coupling
	TM-1	Hor. Plate Dec.
	TC-2	Damper Filter
	TM-15	HV Osc. Plate Dec.
	TM-15	HV Osc. Screen Bypass
	TM-15	HV Osc. Grid Cap.
		HV Filter
		HV Filter
	TM-11	Line Filter
	TM-11	Line Filter
11-005	29C1	3rd V. IF Fil. Bypass

C2B have been reversed.

OLS

INSTALLATION NOTES
Volume control, tapped @ 300KΩ
Attach to R1A per instructions
Horiz. hold control-rear (Dual Concentric)
Vert. hold control-front
Attach per instructions in "Concentrikit"
Contrast control-rear (Dual Concentric)
Brightness control-front
Attach per instructions in "Concentrikit"
Focus control, Wire Wound
Width control, Wire Wound
Height control
Vert. linearity control

c".

ORS

IDENTIFICATION CODES
RESISTORS ARE ± 10% UNLESS OTHERWISE STATED
Grid
Screen
Plate
er Grid
er Screen
Coil Shunt See Note 1
er Coil Shunt
. Grid
. Cathode
. Plate
er Plate Decoupling
Video IF Grid
Video IF Cathode
Video IF Screen Decoupling
Video IF Plate Decoupling
Network
Network
Video IF Grid
Video IF Cathode
Video IF Screen Decoupling
Video IF Grid
Video IF Cathode
Video IF Screen
Network
Rect. Diode Load
Rect. Diode Load
tage Divider
eo Amp. Cathode
eo Amp. Screen
king Coil Shunt
eo Amp. Plate (Wire Wound)
tage Dropping
tage Dropping
ture Tube Grid

RESISTORS (CONT.)

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	WESTINGHOUSE PART No.	IRC PART No.	
R42	10KΩ	½	RC20AE103K	BTS-10K	Voltage Divider
R43	47KΩ	½	RC20AE473K	BTS-47K	Voltage Divider
R44A	650Ω	10	V6550	AB-700	Voltage Divider (Wire Wound)
B	1300Ω	10		AB-1250	Voltage Divider (Wire Wound)
R45	470KΩ	½	RC20AE474K	BTS-470K	Voltage Divider
R46	47KΩ	½	RC20AE473K	BTS-47K	DC Rest. Load
R47	470KΩ	½	RC20AE474K	BTS-470K	DC Rest. Load
R48	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Sync. Phase Inv. Grid
R49	3900Ω	½	RC20AE392K	BTS-3900	Sync. Phase Inv. Cathode
R50	2700Ω	½	RC20AE272K	BTS-2700	Sync. Phase Inv. Plate
R51	10KΩ	½	RC20AE103K	BTS-10K	Voltage Divider
R52	470KΩ	½	RC20AE474K		Sound IF Grid
R53	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg.	AVC Network
R54	470KΩ	½	RC20AE474K	BTS-470K	AVC Network
R55	470KΩ	½	RC20AE474K	BTS-470K	AVC Network
R56	120Ω	½	RC20AE121K		Sound IF Cathode
R57	1000Ω 20%	½	RC20AE102M	BTS-1000	Sound IF Plate Decoupling
R58	33KΩ	½	RC20AE333K	BTS-33K	De-emphasis
R59	10KΩ 5%	½	RC20AE103J	BTS-10K-5%	Ratio Det. Diode Load
R60	10KΩ 5%	½	RC20AE103J	BTS-10K-5%	Ratio Det. Diode Load
R61	22KΩ	½	RC20AE223K	BTS-22K	Tone Compensation
R62	10 Meg.20%	½	RC20AE106M	BTS-10 Meg.	AF Grid
R63	270KΩ	½	RC20AE274K	BTS-270K	AF Plate
R64	47KΩ	½	RC20AE473K	BTS-47K	AF Plate Decoupling
R65	470KΩ	½	RC20AE474K	BTS-470K	Output Grid
R66	330Ω	½	RC20AE331K	BW-½-330	Output Cathode
R67	1800Ω	½	RC20AE182K	BTS-1800	Voltage Divider
R68	22KΩ	½	RC20AE223K	BTS-22K	Integrator
R69	47KΩ	½	RC20AE473K	BTS-47K	Integrator
R70	47KΩ	½	RC20AE473K	BTS-47K	Integrator
R71	47KΩ	½	RC20AE473K	BTS-47K	Vert. MV Plate
R72	390KΩ 5%	½	RC20AE394J	BTS-390K-5%	Vert. MV Plate
R73	330KΩ 5%	½	RC20AE334J	BTS-330K-5%	Vert. MV Grid
R74	2200Ω	½	RC20AE222K	BTS-2200	Vert. MV Cathode
R75	47KΩ	½	RC20AE473K	BTS-47K	Vert. MV Plate Decoupling
R76	3300Ω	½	RC20AE332K	BTS-3300	Vert. Peaking
R77	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg.	Vert. Output Grid
R78	1000Ω	½	RC20AE102K	BTS-1000	Vert. Output Cathode See Note 2
R79	470KΩ	½	RC20AE474K	BTS-470K	Feedback Network
R80	68KΩ	½	RC20AE683K	BTS-68K	Feedback Network
R81	100KΩ 5%	½	RC20AE104J	BTS-100K-5%	Horiz. AFC Diode Load
R82	100KΩ 5%	½	RC20AE104J	BTS-100K-5%	Horiz. AFC Diode Load
R83	4.7Meg.20%	½	RC20AE475M	BTS-4.7 Meg.	Horiz. AFC Diode Load
R84	470KΩ	½	RC20AE474K	BTS-470K	Horiz. AFC Filter Network
R85	1800Ω	½	RC20AE182K	BTS-1800	Horiz. MV Cathode
R86	100KΩ 5%	½	RC20AE104J	BTS-100K-5%	Horiz. MV Grid
R87	5600Ω	½	RC20AE562K	BTS-5600	Horiz. MV Plate
R88	220KΩ	½	RC20AE224K	BTS-220K	Horiz. MV Plate
R89	10KΩ	½	RC20AE103K	BTS-10K	Horiz. MV Plate Decoupling
R90	10KΩ	½	RC20AE103K	BTS-10K	Horiz. Peaking
R91	120Ω	½	RC20AE121K		Parasitic Supp.
R92	120Ω	½	RC20AE121K		Parasitic Supp.
R93	470KΩ	½	RC20AE474K	BTS-470K	Horiz. Output Grid
R94	50Ω	½		BW-½-47	Horiz. Output Cathode See Note 3
R95	33Ω 20%	½	RC20AE330M		Parasitic Supp.
R96	33Ω 20%	½	RC20AE330M		Parasitic Supp.
R97	7500Ω	5	V4759	AB-7500	Horiz. Output Screen (Wire Wound)
R98	1500Ω	5	V6472	AB-1500	Damper Filter (Wire Wound)
R99	190Ω	3	V5134		Focus Coil Shunt (Wire Wound)
R100	68Ω	½	RC20AE680K		Parasitic Supp.
R101	10KΩ	1	RC30AE103K	BTA-10K	HV Osc. Screen
R102	2200Ω	½	RC20AE222K	BTS-2200	HV Osc. Grid
R103	100KΩ	½	RC20AE104K		HV Filter

Note 1. Not used in all models.
Note 2. Some models use 470Ω resistor in this application.
Note 3. Some models use 150Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ 1.5A	530VCT .225ADC	6VAC @ 4A	12.6VAC @ 3.7A	V-6482			

TRANSFORMER (FILAMENT)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T2	117VAC @.075A	6.3VAC @ 1.2A			V-6481	P-6134 ‡	P-2944 ‡	F-633 ‡

‡ Drill one new mounting hole.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	DC RESISTANCE		WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.					
T3	3.6Ω						
T4	490Ω						
T5	650Ω	8Ω	V-6508	A-8115 ‡ DY-1	A-3035 ‡	TS0-1 ‡	Hor.Sync Coil Hor.Output Chk. Coil Vert.Output Chk.Coil Hor.Deflection Coil Vert.Deflection Coil Focus Coil
T6A	27Ω						
B	63Ω						
T7	255Ω						

‡ Drill new mounting holes.

WESTINGHOUSE MODEL H-223 (Ch. V-2150-01, V-2150-02)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (H.V. OSC.)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	DC RESISTANCE		WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC. 1					
T8	1.7Ω	3.7Ω					
		SEC. 2					
		3Ω					
		SEC. 3					
		0Ω					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T9	5500Ω	3.6Ω	440Ω	1.1Ω	V-6480	A-3877	A-2930	RO-9 ‡	‡ Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	WESTINGHOUSE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	3.6Ω	V-6537	ST-108 MOD.P6-X	52A1	
	CONE DIA.	V. C. DIA.				
SP2	5 1/8"	9/16"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ↺)	WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.225A	42Ω	1.4Henries	V6471	C-2325 ‡	C-2974	TR-4200‡	‡ Drill one new mounting hole.

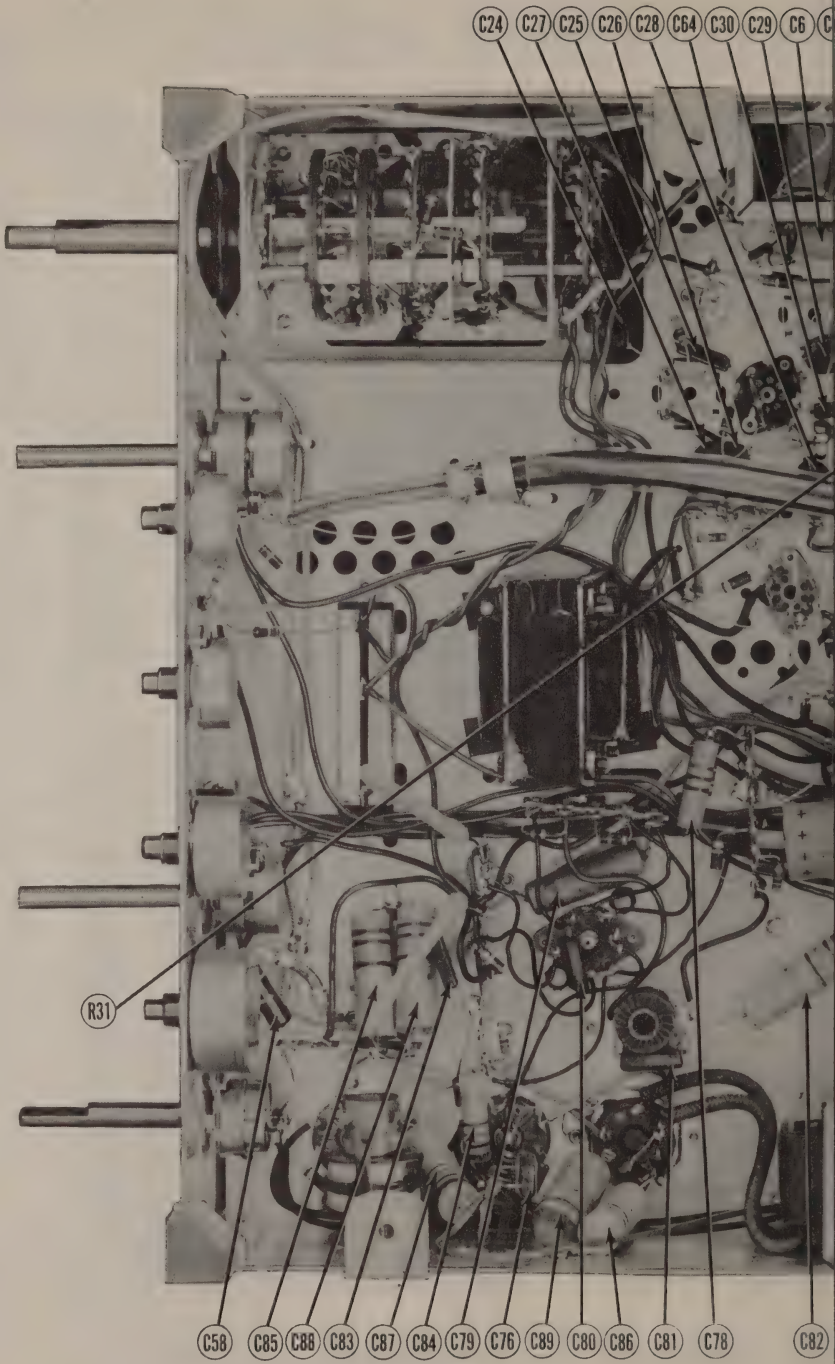
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	WESTINGHOUSE PART No.	MEISSNER PART No.	
L2	Ant. Trans.	0Ω	0Ω			Part of RF tuner.
L3	Fil.Choke	0Ω				Part of RF tuner.
L4	HF Osc. Trap	0Ω		V-4886-2		Not used in all sets.
L5	1st Video IF	0Ω		V-6459		
L6	2nd Video IF	0Ω		V-6459		
L7	2nd Video IF Plate	3Ω		V-5902-7		
L8	3rd Video IF	0Ω		V-6459		
L9	3rd Video IF Plate	3Ω		V-5902-7		
L10	4th Video IF	0Ω		V-6459		
L11	Peaking	4.8Ω		V-5902-4		
L12	Peaking	6.2Ω		V-5902-5		
L13	Peaking	22Ω		V-5902-6		
L14	Sound IF Trans.	2Ω		V-6517		
L15	Ratio Det. Trans.	6Ω	.5Ω	V-6483		
L16	Fil.Choke	0Ω		V-4886-2		
L17	Fil.Choke	0Ω		V-4886-2		
L18	Fil.Choke	0Ω		V-4886-2		
L19	Fil.Choke)	0Ω		V-4886-2		

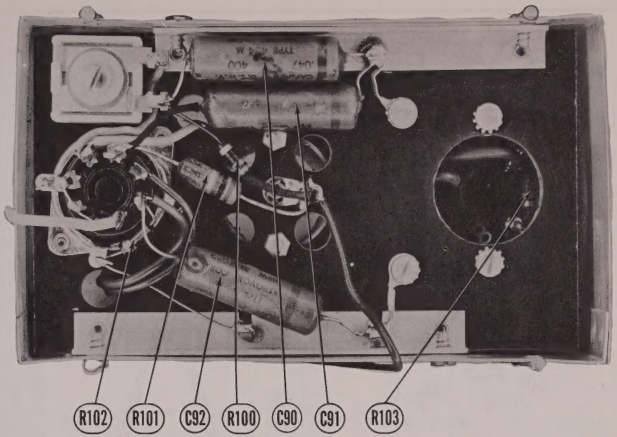
MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
M1	RF Tuner	V-8153	Complete with tubes
M2	Ion Trap	V-6573-1	PM
	Cabinet	V-1174-1	
	Back Cover	V-6433	
	Knob	V-6146-1	Contrast, Hor. Hold (Front)
	Knob	V-6146-5	Volume, On-Off (Front)
	Knob	V-6147-1	Brightness, Vert. Hold (Rear)
	Knob	V-6245-1	Volume, On-Off (Rear)
	Knob	V-7892	Fine Tuning
	Knob	V-7893	Channel Selector
	Safety Glass	V-6288-1	

RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW-



HIGH VOLTAGE SUPPLY - BOTTOM VIEW

HORIZONTAL OSCILLATOR ADJUSTMENT

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the vertical hold control until the picture syncs vertically.

Turn the horizontal hold control to the mid-point of its range.

Adjust the horizontal oscillator adjustment B1 to the center of the range over which the picture syncs horizontally.

HIGH VOLTAGE OSCILLATOR ADJUSTMENT

Turn the set off and disconnect the high voltage button from the picture tube.

Make up a load resistor consisting of 9 one-megohm, one watt, resistors in series. Connect the 9 megohms from the high voltage lead to the chassis.

Connect a kilovoltmeter across the 9 megohm resistance.

Turn the set on and adjust the high voltage oscillator trimmer B2 for maximum reading on the meter. The kilovoltmeter must consist of a VTVM with suitable multiplier probe to measure 10KV.

If a kilovoltmeter is not available, a low range milliammeter connected between the low end of the 9 megohm resistor and the chassis may be used. Adjust B2 for maximum current reading.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove eight screws holding rear cover. Remove cover.
3. Remove speaker leads from chassis.
4. Remove picture tube base socket.
5. Remove three 7/16" hex bolts holding chassis. Remove chassis.
6. Remove four screws holding speaker. Remove speaker.